SAFTRONICS

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AD10

System
Automation
Drive

USER MANUAL

This book is referred to SW version 2.X00

These instructions do not purport to cover all details or variations in equipment, nor to provide every possible contingency to be met during installation, operation, and maintenance. If further information is desired or if particular problems arise that are not covered sufficiently for the purchaser's purpose, the matter should be referred to Saftronics Inc. Fort Myers, FL, USA.

SAFETY SYMBOL LEGEND / LÉGENDE DES SIGNES DE SÉCURITÉ

WARNING! Commands attention to an operating procedure, practice, condition, or statement which, if not strictly observed, could result in personal injury or death.

Attire l'attention sur les modes d'utilisation et les procédés et conditions d'exploitation qui, en cas d'inobservation, pourraient entraîner des blessures corporelles ou la mort.

CAUTION! Commands attention to an operating procedure, practice, condition, or statement which, if not strictly observed, could result in damage or destruction of equipment.

The seriousness of the injuries and of the damages which could be caused by the non- observance of such indications, depends on the different conditions. Anyway, the instructions given below should always be followed with the highest attention.

Attire l'attention sur les modes d'utilization et les procédés et conditions d'exploitation qui, en cas d'inobservation, pourraient entraîner la détérioration ou la destruction des appareils.

La gravité des blessures et des dommages matériels possibles dépendent de différent facteurs. Toutefois, les instructions mentionées ci-dessous devraient être toujours suivies avec la plus grande attention.

NOTE! Commands attention to an operating procedure, practice, condition, or statement that must be highlighted.

Attire l'attention sur les modes d'utilization et les procédés et conditions d'exploitation qui présentent un intéret particulier.

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Chapter 0 - SAFETY PRECAUTIONS / PRECAUTIONS DE SECURIT

NOTE! The terms "Inverter", "Controller" and "Drive" are sometimes used interchangably throughout the industry. We will use the term "Drive" in this document

Les mots "Inverter", "Controller" et "Drive" sont interchangeables dans le domaine industriel. Nous utiliserons dans ce manuel seulement le mot "Drive".

WARNING! / ATTENTION!

- According to the EEC standards the AD10 and accessories must be used only after checking that the machine has been produced using those safety devices required by the 89/392/EEC set of rules.

  Drive systems cause mechanical motion. It is the responsibility of the user to insure that any such motion does not result in an unsafe condition. Factory provided interlocks and operating limits should not be bypassed or modified.
- Never open the device or covers while the AC Input power supply is switched on. Minimum time to wait before working on the terminals or internal devices is listed in section 5.11 on Hardware & Quick Start Up Guide.
- If the front plate has to be removed because the ambient temperature is higher than 40 degrees, the user has to ensure that no occasional contact with live parts will occur.
- Always connect the Drive to the protective ground (PE) via the marked connection terminals (PE2) and the housing (PE1). Adjustable Frequency Drives and AC Input filters have ground discharge currents greater than 3.5 mA. EN 50178 specifies that with discharge currents greater than 3.5 mA the protective conductor ground connection (PE1) must be fixed type and doubled for redundancy.
- The drive may cause accidental motion in the event of a failure, even if it is disabled, unless it has been disconnected from the AC input feeder.

- *Selon les normes EEC, les drives AD10 et leurs accessoires doivent être employés seulement après avoir verifié que la machine ait été produit avec les même dispositifs de sécurité demandés par la réglementation 89/392/EEC concernant le secteur de l'industrie.*

  Les systèmes provoquent des mouvements mécaniques. L'utilisateur est responsable de la sécurité concernant les mouvements mécaniques. Les dispositifs de sécurité prévues par l'usine et les limitations operationelles ne doivent être dépassés ou modifiés.
- *Ne jamais ouvrir l'appareil lorsqu'il est suns tension. Le temps minimum d'attente avant de pouvoir travailler sur les bornes ou bien à l'intérieur de l'appareil est indiqué dans la section 5.11 (Instruction manual).*
- *Si la plaque frontale doit être enlevée pour un fonctionnement avec la température de l'environnement plus haute que 40°C, l'utilisateur doit s'assurer, par des moyens opportuns, qu'aucun contact occasionnel ne puisse arriver avec les parties sous tension.*
- *L'appaeil peut rédémarrer de façon accidentel en cas d'anomalie, sauf s'il a été déconnecté du reseau.*
- *Effectuer toujours des connexions de terre (PE) par le biais des bornes (PE2) et du chassis (PE1). Le courant de dispersion vers la terre est supérieur à 3,5 mA. Selon EN 50178 il faut prévoir dans ces cas une double connexion à terre.*

WARNING! - ELECTRICAL SHOCK AND BURN HAZARD / ATTENTION! – DÉCHARGE ÉLECTRIQUE ET RISQUE DE BRÚLURE :

When using instruments such as oscilloscopes to work on live equipment, the oscilloscope's chassis should be grounded and a differential amplifier input should be used. Care should be used in the selection of probes and

leads and in the adjustment of the oscilloscope so that accurate readings may be made. See instrument manufacturer's instruction book for proper operation and adjustments to the instrument.

Lors de l'utilisation d'instruments (par example oscilloscope) sur des systémes en marche, le chassis de l'oscilloscope doit être relié à la terre et un amplificateur différentiel devrait être utilisé en entrée.

Les sondes et conducteurs doivent être choissis avec soin pour effectuer les meilleures mesures à l'aide d'un oscilloscope. Voir le manuel d'instruction pour une utilisation correcte des instruments.

WARNING! - FIRE AND EXPLOSION HAZARD / ATTENTION! – RISQUE D'INCENDIES ET D'EXPLOSIONS:

Fires or explosions might result from mounting Drives in hazardous areas such as locations where flammable or combustible vapors or dusts are present. Drives should be installed away from hazardous areas, even if used with motors suitable for use in these locations.

L'utilisation des drives dans des zônes à risques (présence de vapeurs ou de poussières inflammables), peut provoquer des incendies ou des explosions. Les drives doivent être installés loin des zônes dangeureuses, et équipés de moteurs appropriés.

WARNING! - STRAIN HAZARD / ATTENTION À L'ÉLÉVATION:

Improper lifting practices can cause serious or fatal injury. Lift only with adequate equipment and trained personnel.

Une élévation inappropriée peut causer des dommages sérieux ou fatals. Il doit être élevé seulement avec des moyens appropriés et par du personnel qualifié.

WARNING! - ELECTRIC SHOCK HAZARD / ATTENTION! - CAS DE DECHARGE ELECTRIQUE:

- Drives and motors must be grounded according to NEC.
- Replace all covers before applying power to the Drive. Failure to do so may result in death or serious injury.
- Adjustable frequency drives are electrical apparatus for use in industrial installations. Parts of the Drives are at high voltage during operation. The electrical installation and the opening of the device should therefore only be carried out by qualified personnel. Improper installation of motors or Drives may therefore cause the failure of the device as well as serious injury to persons or material damage. Follow the instructions given in this manual and observe the local and national safety regulations applicable.

- *Tous les moteurs et les drives doivent être mis à la terre selon le Code Electrique National ou équivalent.*
- *Remettre tous les capots avant de mettre sous tension le drive. Des erreurs peuvent provoquer de sérieux accidents ou même la mort.*
- *Les drives à fréquence variable sont des dispositifs électriques utilisés dans des installations industriels. Une partie des drives sont sous tension pendant l'operation. L'installation électrique et l'ouverture des drives devrait être executé uniquement par du personel qualifié. De mauvaises installations de moteurs ou de drives peuvent provoquer des dommages materiels ou blesser des personnes.On doit suivir les instructions donneés dans ce manuel et observer les régles nationales de sécurité.*

CAUTION! / PRECAUTION!:

- Do not connect power supply voltage that exceeds the standard specification voltage fluctuation permissible. If excessive voltage is applied to the Drive, damage to the internal components will result.
- Do not operate the Drive without the ground wire connected. The motor chassis should be grounded to earth through a ground lead separate from all other equipment ground leads to prevent noise coupling.
- The grounding connector shall be sized in accordance with the NEC or Canadian Electrical Code. The connection shall be made by a UL listed or CSA certified closed-loop terminal connector sized for the wire gauge involved. The connector is to be fixed using the crimp tool specified by the connector manufacturer.
- Do not perform a megger test between the Drive terminals or on the control circuit terminals.
- Because the ambient temperature greatly affects Drive life and reliability, do not install the Drive in any location that exceeds the allowable temperature. Leave the ventilation cover attached for temperatures of

104° F (40° C) or below.

- If the Drive's Fault Alarm is activated, consult the TROUBLESHOOTING section of Hardware & Quick Start Up Guide., and after correcting the problem, resume operation. Do not reset the alarm automatically by external sequence, etc.
- Be sure to remove the desicant dryer packet(s) when unpacking the Drive. (If not removed these packets may become lodged in the fan or air passages and cause the Drive to overheat).
- The Drive must be mounted on a wall that is constructed of heat resistant material. While the Drive is operating, the temperature of the Drive's cooling fins can rise to a temperature of 194° F (90°C).
- Do not touch or damage any components when handling the device. Changing of isolation gaps or removing the isolation covers is not permissible.
- Protect the device from disallowed environmental conditions (temperature, humidity, shock etc.)
- No voltage should be connected to the output of the frequency inverter (terminals U2, V2 W2). The parallel connection of several frequency inverters via the outputs and the direct connection of the inputs and outputs (bypass) are not permissible.
- A capacitative load (e.g. Var compensation capacitors) should not be connected to the output of the frequency inverter (terminals U2, V2, W2).
- The electrical commissioning should only be carried out by qualified personnel, who are also responsible for the provision of a suitable ground connection and a protected power supply feeder in accordance with the local and national regulations. The motor must be protected against overloads.
- No dielectric tests should be carried out on parts of the frequency inverter. A suitable measuring instrument (internal resistance of at least 10 kΩ/V) should be used for measuring the signal voltages.
- *Ne pas raccorder de tension d'alimentation dépassant la fluctuation de tension permise par les normes. Dans le cas d' une alimentation en tension excessive, des composants internes peuvent être endommagés.*
- *Ne pas faire fonctionner le drive sans prise de terre. Le chassis du moteur doit être mis à la terre à l'aide d'un connecteur de terre separé des autres pour éviter le couplage des perturbations. Le connecteur de terre devrait être dimensionné selon la norme NEC ou le Canadian Electrical code. Le raccordement devrait être fait par un connecteur certifié et mentionné à boucle fermé par les normes CSA et UL et dimensionné pour l'épaisseur du cable correspondant. Le connecteur doit être fixé a l'aide d'un instrument de serrage specifié par le producteur du connecteur.*
- *Ne pas exécuter un test megger entre les bornes du drive ou entre les bornes du circuit de contrôle.*
- *Étant donné que la température ambiante influe sur la vie et la fiabilité du drive, on ne devrait pas installer le drive dans des places ou la temperature permise est dépassée. Laisser le capot de ventilation en place pour températures de 104°F (40°C) ou inférieures.*
- *Si la Fault Alarm du drive est activée, consulter la section du manuel concernant les défauts et après avoir corrigé l'erreur, reprendre l'opération. Ne pas réiniliatiser l'alarme automatiquement par une séquence externe, etc….*
- *Lors du déballage du drive, retirer le sachet déshydraté. (Si celui-ci n'est pas retiré, il empêche la ventilation et provoque une surchauffe du drive).*
- *Le drive doit être monté sur un mur construit avec des matériaux résistants à la chaleur. Pendant le fonctionnement du drive, la température des ailettes du dissipateur thermique peut arriver à 194°F (90°).*
- *Manipuler l'appareil de façon à ne pas toucher ou endommager des parties. Il n'est pas permis de changer les distances d'isolement ou bien d'enlever des matériaux isolants ou des capots.*
- *Protéger l'appareil contre des effets extérieurs non permis (température, humidité, chocs etc.).*
- *Aucune tension ne doit être appliquée sur la sortie du convertisseur (bornes U2, V2 et W2). Il n'est pas permis de raccorder la sortie de plusieurs convertisseurs en parallèle, ni d'effectuer une connexion directe de l'entrée avec la sortie du convertisseur (Bypass).*
- *Aucune charge capacitive ne doit être connectée à la sortie du convertisseur (bornes U2, V2 et W2) (par exemple des condensateurs de mise en phase).*

- *La mise en service électrique doit être effectuée par un personnel qualifié. Ce dernier est responsable de l'existence d'une connexion de terre adéquate et d'une protection des câbles d'alimentation selon les prescriptions locales et nationales. Le moteur doit être protégé contre la surcharge*
- *Il ne faut pas éxécuter de tests de rigidité diélectrique sur des parties du convertisseurs. Pour mesurer les tensions, des signaux, il faut utiliser des instruments de mesure appropriés (résistance interne minimale 10 kΩ/V).*

NOTE! If the Drives have been stored for longer than three years, the operation of the DC link capacitors may be impaired. Before commissioning devices that have been stored for long periods, connect them to a power supply for two hours with no load connected in order to regenerate the capacitors, (the input voltage has to be applied without enabling the inverter).

En cas de stockage des convertisseurs pendant plus de trois ans, il faut tenir compte du fait que les condensateurs du circuit intermédiaire gardent leurs caractéristiques d'origine seulement s'ils sont alimentés avant trois ans, à partir de leur date de fabrication. Avant la mise en service des appareils, qui sont restés stockés aussi longtemps, il est conseillé d'alimenter les convertisseurs pendant au moins deux heures, pour récupérer les caractéristiques d'origine des condensateurs : appliquer une tension d'entrée sans activer le convertisseur ***(Disable).***

Chapter 1 - FUNCTION DESCRIPTION

1.1 GENERAL CONSIDERATIONS

The drive control diagram is made of functional **Blocks** each representing a part of the total function. For example speed regulator, ramp etc., each containing some **Variables**, the gains, the ramp times, the limits etc. The input and / or output of **Blocks** are interconnected to make the complete system function. Such interconnections are called **SIGNALS**.

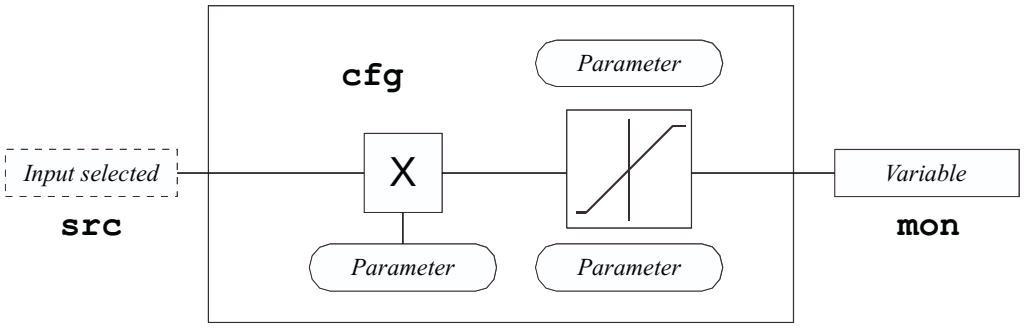
The setting of the Drive parameters/variables can be performed via the keypad or a PC Configurator.

The structure of the menu functions is the following:

src (***Source***)	**These are parameters that select <u>where</u> an input comes from. The selections are from a pick-list**. The source is aimed at controlling (or enabling) the Block inputs.
cfg (*Configuration*)	These are parameters that define how the function or parameter acts. For example: Ramp times, internal references adjustments.
mon (Monitor)	Signals in this menu are variables. They are read only, and show the value or state of a signal.

The three above elements are inside a menu, as needed by each single Block.

Example Block:



This chapter describes:

- Variable connection methods
- Block functions
- Signal normalization

1.1.1 Variable Connection Methods

The **source** allows you to assign the signal for the input Block.

Thanks to a predefined list, **pick-list**, the user can select the signal origin by connecting it to the input Block.

The signal selected will be assigned to the source. This signal controls the Block Function and is therefore defined as a control signal. The signals come from different points of the control system.

The connection points can derive from:

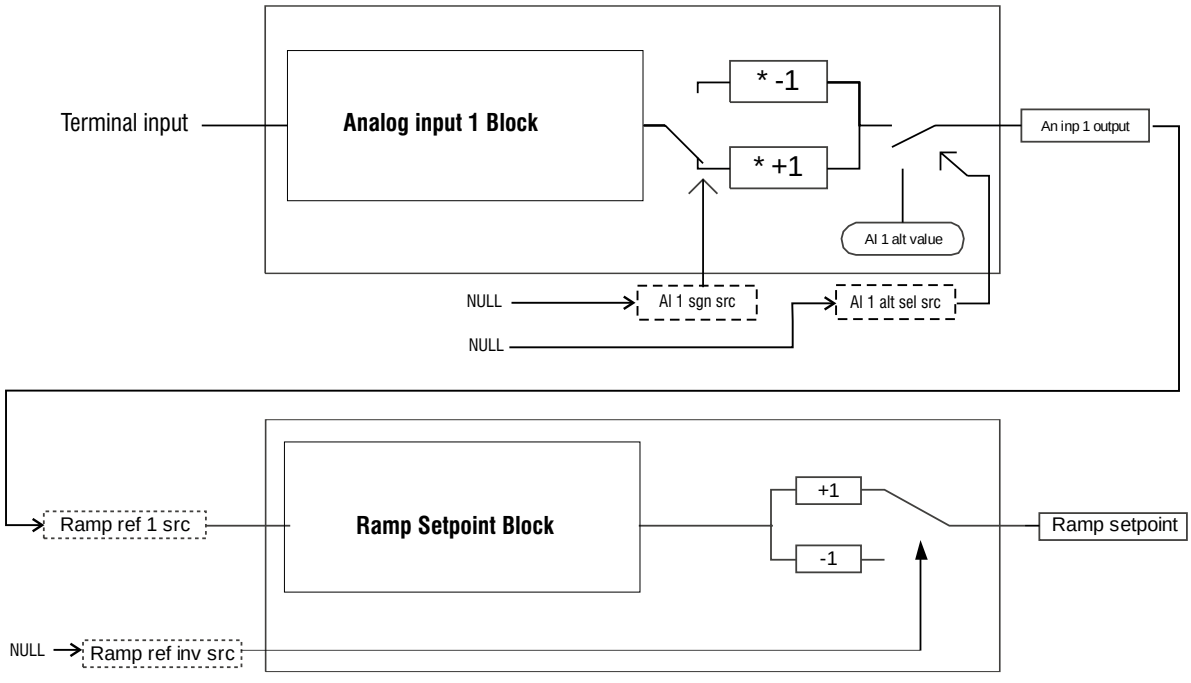
1 - Physical terminal board	analog and digital signals from the drive terminal strip and from the EXP expansion cards.
2 - Analog and digital signals	from DGFC option cards, Field Bus, keypad.
3 - Drive internal variables using	keypad or toolbox.

The control signal is always connected on the Source of each Block. The state of this signal depends on the Block Function.

For example:

- the Ramp Setpoint Block which generates the ramp reference, defaults ***Ramp ref 1 src*** source from the *Analog input 1 output* signal (the Block output on the analog Input 1). This signal is in the pick-list of the Ramp ref 1 src, and can be changed. For example *Int ramp ref 1* (Ramp setpoint block internal value).

- the analog Input Block, connects on its ***Ai 1 sgn src*** Source (which inverts the output reference signal) the NULL signal. If the user wants to enable the specific function, he has to make a selection inside the pick-list of the Ai 1 sgn src (for example ONE, Digital Input 1, etc.).



NOTE! ***AI 1 alt sel src*** source allows you to select the signal to enable an alternative output reference.

AI 1 alt value parameter determines the value of the alternative output reference.

Ramp ref inv src allows you to select the signal for inverting the final output setpoint.

1.1.2 Block Functions

Here is an example referring to the setting of a ***digital signal*** (Ramp output = 0) and of an ***analog signal*** (Speed ref 1).

Digital signal

Let's consider a **section** of the Ramp Block.

In Ramp funct src menu, the source ***Ramp output = 0*** allows the output of the RampBlock to be set to zero. By editing (for example via the keypad by pressing *enter)* the source ***Ramp output*** = *0*, the pick-list of the possible signal sources of control is displayed.

The selected signal on the source, will be enable the Ramp output = 0 function.

The Ramp funct cfg menu configures the block parameters. The Ramp funct mon display the signal state.

`RAMP CONFIG / Ramp function /` ***`Ramp funct src`***

`Ramp output=0`

.....

The following commands are available in the source *Ramp output=0* (it is standard connected to `Null`):

`One`	it connects the signal to One, Active
`Null`	it connects the signal to Zero, Non-active
`DI 1 monitor`	it connects the signal to the standard digi tal input 1, being active or non-active is a function of the digital input state
.....	.....
`DI 0X monitor`	it connects the signal to the expanded dgt 0 input
`B0 W0 decomp`	it connects the signal to a digital bit de rived from a complete word. For more detail on this feature, refer to the 2.6.6 'chapter.
.....	.....

`RAMP CONFIG / Ramp function /` **`Ramp funct cfg`**

`Ramp shape`

.....

The *Ramp shape* configuration allows to select the Ramp:

`Linear`	it sets the Linear Ramp
`S-Shaped`	it sets the S Ramp

`RAMP CONFIG / Ramp function /` **`Ramp funct mon`**

`Ramp out mon`

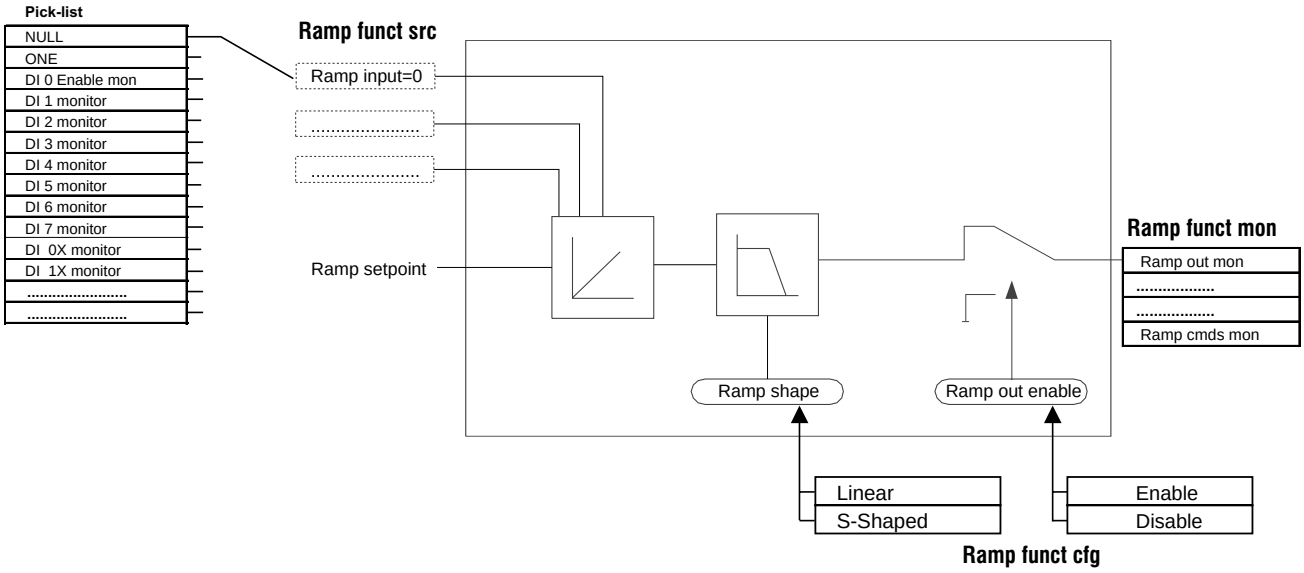
.....

It is possible to monitor:

`Ramp out mon`	Output Ramp monitor
`Ramp cmds mon`	Ramp Block command monitor
.....	**.....**

NOTE! The points **.....**, refer to other possibilities parameters in the menus.

Ramp function Block example



NOTE! *Ramp out enable* parameter allows to enable or disable the Ramp output .

Analog signal

Let's consider a section of the Speed Block. In Speed ref src menu the source ***Speed ref 1 src*** selects the signal origin to the Speed block input**.** Creating the Speed reference. By editing the source the pick-list of the signal possible sources is displayed.

The block parameters are configured in the Speed ref cfg menu. The Speed ref mon menu allows to monitor the signal state.

```
SPEED CONFIG / Speed setpoint / Speed ref src
                Speed ref 1 src
                .....
```

The items of the *Speed ref 1 src* source are:

Int speed ref 1	it connects the signal to the Int speed ref 1. This variable allows the value digital setting, set internally by keypad or toolbox.
.....	
An inp 2 output	connects the signal to the An inp 2 output. Block to the standard analog input 2.
.....	
An inp 1X output	it connects the signal to the expanded analog input 1.
.....	
SBI Drv W0 mon	it connects the signal to the W0 monitor deriving from the SBI.
.....	
ISBus Drv W4 mon	it connects the signal to the W4 monitor deriving from ISBus.
.....	

SPEED CONFIG / Speed setpoint / **Speed ref cfg**

Int speed ref 1

.....

It is possible to configure:

Int speed ref 1 it states the reference value

.....

SPEED CONFIG / Speed setpoint / **Speed ref mon**

Speed ref 1 mon

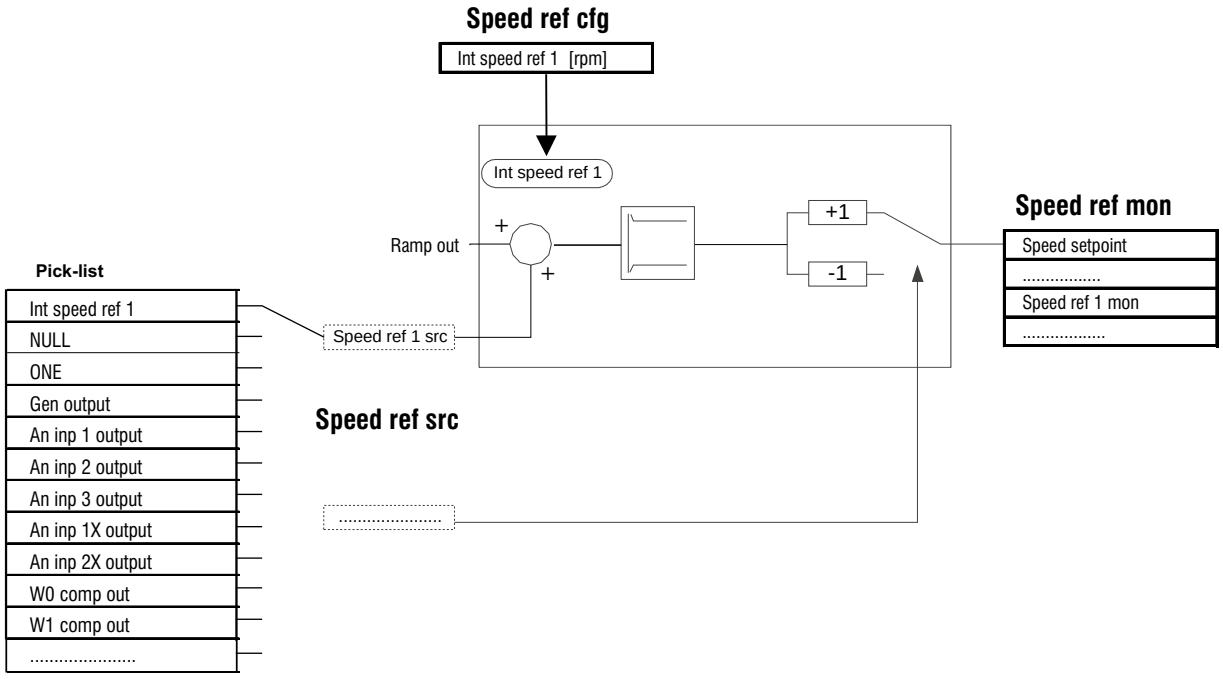
.....

It is possible to monitor:

Speed ref 1 mon it states the reference value

.....

Speed setpoint Block example



1.1.3 Signal Normalization

This paragraph describes the relationship between the physical units (rpm, Nm, A etc) and the Drive internal values. The different values which can be read via process channels are stated through an internal value (Count value) and the corresponding physical unit or parameter containing the reference value (Parameter name or Physical unit value).Sometimes the paragraph makes reference to tables listed in the following pages.

The conversion type, always linear, is stated for an internal use. The code N/A (Not allowed) refers to a one to one conversion.

IPA = Parameter number

Parameter Name	Ipa	Normalized	Normalized Physical value
NULL	4000		N/A
ONE	4001		N/A
Output voltage	3060	16384	Table2 last column
Output current	3070	16384	Table1 last column
Output frequency	3080	16384	Table4 last column
DC link voltage	3100	16384	500V
Magnetizing curr	3110	16384	Table1 last column
Torque curr	3120	16384	Table1 last column
Magn curr ref	3130	16384	Table1 last column
Torque curr ref	3140	16384	Table1 last column
Current phase U	3150	16384	Table1 last column
Current phase V	3160	16384	Table1 last column
Current phase W	3170	16384	Table1 last column
Flux ref	3180	16384	1Wb
Flux	3190	16384	1Wb
Ramp ref	3200	16384	Full scale speed
Speed ref	3210	16384	Full scale speed
Speed	3220	16384	Table3 last column
Norm Speed	3221	16384	Full scale speed
Fault Pin	9098		N/A
Norm Std enc spd	3222	16384	Full scale speed
Norm Exp enc spd	3223	16384	Full scale speed
Drv OL accum %	1540	16384	100%
Mot OL accum %	1670	16384	100%
BU OL accum %	1781	16384	100%
Drive ready	161		N/A
Enable SM mon	162		N/A
Start SM mon	163		N/A
FastStop SM mon	164		N/A
ALM Sequencer	9096		N/A
Drive OK	9097		N/A
Jog state	8013		N/A
Gen output	2760		N/A
An inp 1 output	5009	16384	10V or 20mA
An inp 2 output	5029	16384	10V or 20mA
An inp 3 output	5049	16384	10V or 20mA
An inp 1X output	5067	16384	10V or 20mA
An inp 2X output	5087	16384	10V or 20mA

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Parameter Name	Ipa	Normalized	Normalized Physical value
W0 comp out	2116		N/A
W1 comp out	9356		N/A
Ramp setpoint	7034	16384	Full scale speed
Ramp out mon	8022	16384	Full scale speed
Speed setpoint	7047	16384	Full scale speed
Speed draw out	7099	16384	Full scale speed
Jog output	8012	16384	Full scale speed
Mlt spd out mon	7070	16384	Full scale speed
Mpot output mon	7090	16384	Full scale speed
Torque ref	2450	8192	Motor nominal torque
Tcurr lim +	1210	16384	Table1 last column
Tcurr lim -	1220	16384	Table1 last column
Inuse Tcurr lim+	1250	16384	Table1 last column
Inuse Tcurr lim-	1260	16384	Table1 last column
Inuse Outvlt ref	1180	16384	Table2 last column
PL next factor	2282	16384	100%
PID FF mon	7217	16384	100%
PID input	7256	16384	100%
PID PI out mon	7294	16384	100%
Last PI out	7295	16384	100%
PID PD out mon	7343	16384	100%
PID out mon	7352	16384	100%
PID outS mon	7353	16384	100%
Std enc position	9553		Std enc ppr * 4
Exp enc position	9554		Exp enc ppr * 4
H Index register	9555		N/A
L Index register	9556		N/A

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NOTE! See next tables below for table 1 - 2 - 3 - 4.

Table 1: Current Scale values (Amps = 16384 count)	
Drive size - 6K	**Current = 16384 count**
0.75 KW - 0.75 Hp	3.82 A
1.5 KW - 1.5 Hp	6.18 A
2.2 KW - 2.0 Hp	8.86 A
3.0 KW - 3.0 Hp	11.8 A
4.0 KW - 5.0 Hp	14.97 A
5.5 KW - 7.5 Hp	19.97 A
7.5 KW - 10 Hp	27.92 A
11 KW - 15 Hp	39.02 A
15 KW - 20 Hp	52.03 A
22 KW - 25 Hp	74.58 A
30 KW - 30 Hp	90.65 A
37 KW - 40 Hp	117.85 A
45 KW - 50 Hp	149.17 A
55 KW - 60 Hp	181.3 A
75 KW - 75 Hp	214.27 A
90 KW - 100 Hp	299.49 A
110 KW - 125 Hp	299.49 A
132 KW - 150 Hp	399.49 A
160 KW - 200 Hp	417.17 A
Drive size - DS	**Current = 16384 count**
250 Hp	553.29 A
300 Hp	886.09 A
350 Hp	886.09 A
400 Hp	886.09 A
450 Hp	886.09 A
500 Hp	1659.87 A
600 Hp	1659.87 A
700 Hp	1659.87 A
800 Hp	1659.87 A

Table 2 : Voltage Scale values (Volts = 16384 count)	
Mains voltage	**Voltage = 16384 count**
230 V	217.5 V
380 V	378.3 V
400 V	378.3 V
415 V	378.3 V
440 V	435.1 V
460 V	435.1 V

Table 3: Speed Reference/Feedback resolution Scale	
Spd ref/fbk res	**Speed = 16384 count**
0.125 rpm	2048 rpm
0.25 rpm	4096 rpm
0.5 rpm	8192 rpm

Table 4: Regulation Mode-Switching Frequency Scale	
Switching Frequency	**Frequency = 16384 count**
V/f Control = 2 KHz	1000 Hz
Field Oriented = 2 KHz	125 Hz
Sensorless vect = 2 KHz	62.5 Hz
V/f Control = 4, 8, 16 KHz	2000 Hz
Field Oriented = 4, 8, 16 KHz	250 Hz
Sensorless vect = 4, 8, 16 KHz	125 Hz

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1.2 DRIVE STATUS MENU (STATUS)

This menu displays a series of variables useful to check the Drive state.
The variable function is clearly explained by the variable name.
In case it is needed, a short explanation is added.

Some variables are not applicable to all the different regulation modes.

In this case the display does not show the variable name but the writing N/A, "Not Available".

The status variables are noted with a letter to show any ties to a specific regulation mode:

S Sensorless
F Field oriented
V V/f

If a variable is not available with a specific regulation mode, the system writes on its side the mode with which it is active. Example: `Torque ref [S, F]`, valid only with **S** and **F**.

1.2.1 Status

STATUS

`Output voltage`	Voltage on the output terminals [V]
`Output current`	Current on the output terminals [A]
`Output power`	Power on the output terminals [kVA]
`Torque ref[S, F]`	Torque reference on the motor [Nm]
`Output frequency`	Output frequency [Hz]
`Norm speed`	Motor speed [rpm]
`Speed ref`	Motor speed reference [rpm]
`Ramp ref`	Ramp Reference [rpm]
`Enable SM mon`	It shows the Drive Enable state (1= on , 0 = off)
`Start SM mon`	It shows the Drive Start state (1= on , 0 = off)
`FastStop SM mon`	It shows the Drive Fast Stop state (1= on , 0 = off)

1.2.2 State of the Digital Inputs/Outputs (I/O Status)

Menu displays the state on the Drive Digital inputs and outputs, at the drive terminal points.
The first line shows the numbers of the digital I/Os.
The second line shows, under each number, the I/O state (0 or 1). The state detects the voltage presence (1) or absence (0).

'E' Enable terminal
'A' Terminal 10 Digital input 10
'B' Terminal 11 Digital input 11
'X' Expanded

I/O status

DI	7654321E 00000000	Standard digital inputs
DO	3210 0000	Standard Digital outputs
DIX	BA9876543210 000000000000	Expanded digital inputs
DOX	76543210 00000000	Expanded digital outputs

1.2.3 Drive Advanced States (Advanced Status)

Advanced Status

DC link voltage		Drive DC link voltage
Magnetizing curr		Drive magnetizing current in Amps
Torque curr		Drive torque current in Amps
Magn curr ref	[S,F]	Magnetizing current reference in Amps
Torque curr ref	[S,F]	Torque current reference in Amps
Flux ref	[S,F]	Drive flux reference in Webers
Flux	[S,F]	Flux in Webers
Mot OL accum %		Accumulated timer counts of the motor I2t
BU OL accum %		Accumulated timer counts of the Scale Unit (BU) I2t
Drv OL accum %		Accumulated timer counts of the Drive I2t
Norm Std enc spd		Standard encoder speed (Std)
Norm Exp enc spd	[F]	Expanded encoder speed (Exp)
Std enc position	[F]	Raw accumulated encoder pulses (counts) of the Std encoder
Exp enc position	[F]	Raw accumulated encoder pulses (counts) of the Exp encoder
Std sin enc mod		Module of sinusoidal encoder, “A” and “B” trace
HT sensor temp		Heatsink temperature °C
RG sensor temp		Temperature on the regulation card °C
IA sensor temp		Temperature of the heatsink incoming air temperature (available from the size...)
Sequencer status		Sequencer status (State machine) see table below for status
CPU1 runtime		Time needed by the CPU1 (microprocessor)
CPU2 runtime		Time needed by the CPU2 (microprocessor)

The drive State Machine, controls the drive running and starting, accounting for protection & alarming, command sequence, and reset status.

The waiting phase for the State Machine reset is showed in the Alarm List as Sequencer. The table below displays various operation states by Sequencer status number. See section 1.12.2 , Alarm state for more details.

Sequencer status	State
1	Magnetization running
2	Magnetization completed, Stop
3	Start
4	Fast stop, Stop
5	Fast stop, Start
9	No alarm, drive is ready to accept all commands
10	Magnetization running and Start command already present
12	Alarm active
16	Alarm not active, waiting for reset

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1.2.4 DriveID States (Drive ID Status)

This menu shows the Drive identification values.

Drive ID status

Drive cont curr	Drive maximum continuos current rating
Drive size	Drive size rating in kW of HP
Drive type	Drive type (Saftronics = 288)
Drive name	Drive name set using Saftronics PC tool
Actual setup	Setup motor file in use
Software version	Software version
Software type	Software type factory use
Software status	Software state factory use
Life time	Drive life time accumulated with power on
Sys time - ddmmyy	Time and date setting from PC tools or serial communications

NOTE! on the new regulation card the variable called "Sys time - ddmmyy" take the value:

time = 00:00:00 date = 010170

With PC tools or serial communication is possible to set this variable at the actual date and time. After this operation the clock is active only when the Drive is powered on.

The size number is shown in the Drive Size table below.

Drive size -	Size number
0.75 KW - 0.75 Hp	0
1.5 KW - 1.5 Hp	1
2.2 KW - 2.0 Hp	2
3.0 KW - 3.0 Hp	3
4.0 KW - 5.0 Hp	4
5.5 KW - 7.5 Hp	5
7.5 KW - 10 Hp	6
11 KW - 15 Hp	7
15 KW - 20 Hp	8
22 KW - 25 Hp	9
30 KW - 30 Hp	10
37 KW - 40 Hp	11
45 KW - 50 Hp	12
55 KW - 60 Hp	13
75 KW - 75 Hp	14
90 KW - 100 Hp	15
110 KW - 125 Hp	16
132 KW - 150 Hp	17
160 KW - 200 Hp	18

Drive size -	Size number
250 Hp	2
300 Hp	3
350 Hp	4
400 Hp	5
450 Hp	6
500 Hp	7
600 Hp	8
700 Hp	9
800 Hp	10

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1.2.5 Alarm Register (Alarm Log)

This function provides storical list of Drive trips or various system error messages. Together with cause indications also time and date information is provided. This information is refered to variable "Sys time - ddmmyy".

Example:

Sys time	ddmmyy
03 : 11 : 42	010100

Undervoltage

Alarm type

1.3 DRIVE INITIALIZATION (STARTUP - SETUP MODE)

This menu heading covers:

- Selection of the regulation mode.

  The drive can control the motor in three different ways:

  V/f (VF), **Field Oriented** (FOC) and **Sensorless vect** (SLS).

  The three methods are completely independent.

  With such a condition each regulation mode can be configured differently from all the others.

- Switching to the Setup mode.

  With this mode it is possible to set the Drive and motor data and, if required, to start the process for the motor data automatic measuring. The measured data can be stored in a file (Setup 0 or 1 or 2 or 3) via the **save setup** command. In this way the detected data can be used during the automatic calculation of the Flux and Current loop gains.

- Automatic calculation of the flux and current loop gains according to the performed measuring processes (**load setup**).

- Setting of the information about:

  -maximum speed

  -encoder features, if used.

  -Parameters of the I2t protections.

  -Configuration of the V/f mode.

- Database storage.

  The setting of the above-mentioned features changes the relationships among the different parameters. As a consequence, after changing the parameters belonging to this menu, it is necessary to store the whole database via the **save config** command.

Such settings can be changed only with a disabled drive. While in this operation mode (Configuration) the data updating on the terminal strip and on the option cards is stopped.

After downloading drive parameters from a file, or entering the STARTUP MENU through the keypad, the drive restart is only permitted after:

a)cycling drive power

or:

b) when commands select = Terminal level, cycling input DI0, when commands select = Terminal edge, cycling input DI0, and the digital input selected by Term strstp src, when commands select = Digital level, cycling the digital signals selected by Digital strstp src and Digital enable src when commands select = Digital edge, cycle input DI0 or the digital input Digital enable src (if not selected to ONE), and the digital signal selected by Digital strstp src

1.3.1 Selection of the Regulation Mode (Regulation Mode)

It allows to select the desired regulation mode.

After choosing the setting, the Drive carries out the restart phase by setting the selected regulation mode.

Description:

```
STARTUP
    Regulation mode
        Regulation mode
            Select new mode
Save config ?
```

NOTE! when the Regulation mode function is selected, the active regulation mode is displayed: in order to enter the Select new mode press "Enter".

1.3.2 Drive Starting Configurations (Startup Config)

With this menu configures:

- the Drive Setup
- the speed scale factor
- the Encoders
- the V/F control
- the motor and braking unit "I2t" protection
- and to use the recipes

1.3.2.1 Setup Mode (Enter setup mode)

Enter setup mode It allows to enter the Setup mode where it is possible to set some Drive parameters and the motor parameters, and to perform the data measuring on the motor, autotune (with a moving or stopped rotor) for the calculation of the current and flux loop gains.

Description:

STARTUP
Startup config
Enter setup mode

NOTE! the following description is valid when the SETUP MODE has been entered via *Enter setup mode*. Every time it is required to enter and afterwards to exit the setup mode, the Drive carries out the Restart procedure (the drive will take around 15 seconds). After saving the setup, it is required to load the setup to have the drive usit.

SETUP MODE

Drive data	**Drive parameters**
Mains voltage	Power supply voltage (230 – 380 – 400 – 415 – 440 – 460)
Ambient temp	Ambient temperature (40°C standard)
Switching freq	PWM Switching frequency (2 – 4 – 8 – 16 kHz)
SPD ref/fbk res	Resolution of the speed references (0 .125rpm, 0 . 250rpm, 0 . 500rpm)
Motor data	**Motor parameters**
Rated voltage	Motor rated voltage
Rated frequency	Motor rated frequency
Rated current	Motor rated current
Rated speed	Motor rated speed
Rated power	Motor rated power
Cosfi	Motor cosΦ
Efficiency	Motor efficiency
Load default mot	It selects and loads the motor standard parameters: Standard 400V or Standard 460V

NOTE! by selecting one of the two factors, the motor standard parameters with 460V (or 400V) are loaded making reference to the used Drive size. Through this process, old data is overwritten.

CurrentReg autotune	**Current loop self-tuning**
Start ?	enabling of the data detection
Press I *key*	consent to the procedure start
Result	Detected values (or Drive standard values):
Measured Rs	resistance detected on the Stator
Measured Rr	resistance detected on the Rotor
Measured Rr2	resistance2 detected on the Rotor
Measured DTL	dead time limit
Measured DTS	dead time slope
Measured LsSigma	stator inductance
FluxReg autotune	**Flux loop self-tuning**
Shaft rotating	Self-tuning with a **moving** Rotor
Start ?	enabling of the data detection
Press I *key*	consent to the procedure start
Results	detected values (or Drive standard values)**:**
Measured P1 flux	**P1** coefficient of the flux curve
Measured P2 flux	**P2** coefficient of the flux curve
Measured P3 flux	**P3** coefficient of the flux curve
Measured ImNom	value of the rated magnetizing current
Measured ImMax	value of the maximum magnetizing current
Measures FluxNom	value of the rated flux
Measures FluxMax	value of the maximum flux
At standstill	Self-tuning with a **stopped** Rotor
Start ?	enabling of the data detection
Press I *key*	consent to the procedure start
Results	
Measured P1 flux	**P1** coefficient of the flux curve
Measured P2 flux	**P2** coefficient of the flux curve
Measured P3 flux	**P3** coefficient of the flux curve
Measured ImNom	value of the rated magnetizing current
Measured ImMax	value of the maximum magnetizing current
Measures FluxNom	value of the rated flux
Measures FluxMax	value of the maximum flux
Save setup	**Saving of the set and detected data**
save as ?	it allows to select 4 files where 4 different setups can be saved.
setup 0	selection of setup 0 – 1 – 2 – 3
Review setup	**Recall of the saved setup files**
select setup ?	it allows to select the saved setup file
setup 0	selection of setup 0 – 1 – 2 – 3
Exit setup mode	**Exit from the setup mode** (the drive will take around 15 seconds)

1.3.2.2 Loading of the Setup Settings (Load Setup)

In order to be used by the Drive, the performed SETUP has to be **loaded.**

The "Load Setup" function allows to load the desired Setup file. It also **carries out the calculation of the gains** of the regulation system.

Description:

STARTUP
- **Startup config**
  - Load setup — it allows to load the saved setup
  - Select setup ? — it selects the setup to be loaded (setup 0-1-2-3)

Save config ?

1.3.2.3 Speed Scale (Full Scale Speed)

It allows to set the speed normalization value. In other words, what rpm is 100% speed.

(See chapter 1.1.3 Signal Normalizations)

Description:

STARTUP
- **Startup config**
  - Full scale speed — normalization value of the Drive speed

save config ?

1.3.2.4 Encoder Configuration (Encoders Config)

The function allows to configure, on the regulation card, some standard encoder inputs identified as "std" and some expanded encoder inputs identified as "exp", which can be obtained using the expansion option card.

The ***Spd fbk sel src*** source allows to select the origin of a command encoder signal. It has connected *Int spd fbk sel* through which it is possible to switch the feedback between the *Encoder sta* and the *Encoder exp*.

The command can be activated only with a **Field Oriented** mode.

The Index Storing function is available for positioning applications to detect the zero cam position (see the paragraph below).

Description:

STARTUP
- **Startup config**
- **Encoders config**
  - Speed feedback
    - Int spd fbk sel
    - Spd fbk sel src
  - Std enc type
  - Std enc pulses
  - Std dig enc mode

Std enc supply
Std sin enc Vp
Exp enc type
Exp enc pulses
Rep/Sim encoder
Index storing

Save config ?

Encoders config

Speed feedback

Int spd fbk sel — Encoder input selection:
- Std encoder — standard encoder input (default)
- Exp encoder — expanded encoder input, using option cards: S6KCV301ENC, S6KCV301D14A4F

Spd fbk sel src — Command source for the selection of the encoder used for speed feedback (factory setting: *Int spd fbk sel*)

Std enc type — Encoder type connected to the std input, it can be selected as:
- Frequency input — digital single channel frequency input: channel A. Signal +5V must be connected between A and power supply common.
- digital — digital encoder (factory setting)
- sinusoidal — sinusoidal encoder, select the correct jumper settings on the regulation card, RV33 - 1 (see section 1.6 in the Hardware Guide)

Std enc pulses — Encoder pulses per revolution (ppr) value of the standard input (factory setting =1024 ppr)

Std dig enc mode — measuring method of the digital encoder speed connected to the standard input. It can be:
- FP — frequency and period measuring.(factory setting)
- F — frequency measuring

The FP mode has a higher resolution (position can drift with a 0 reference),default value.
The F mode has lower resolution at high speeds, but is better at low speeds by varying the drive's encoder scan rate. This provides low drift at 0 Reference.

Std enc supply — Power supply voltage of the standard Encoder input.
It can be selected among 6.16, 5.91, 5.68, 5.41 V
to compensate long motor length cable (factory setting = 5.41 V)

Std sin enc Vp — Peak voltage value of the sinusoidal encoder connected to the standard input. Range between 0.5V (default value) and 1.5V.

Exp enc type — encoder type connected to the Exp input, it can be selected as:
- Digital — digital encoder
- Frequency input — digital single channel frequency input: channel A. Signal +5V must be connected between A and power supply common.

`Exp enc pulses` encoder pulses per revolution (ppr) value of the expanded input (factory setting = 1024 ppr)

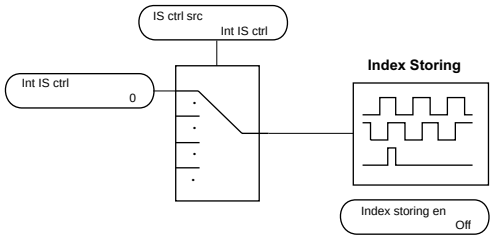
`Rep/sim encoder`

`Rep/sim enc sel` selection of the encoder to be repeated using the optional card 6KCV301ENC (input/output):

`Repeat std enc` repeat standard encoder

`Repeat exp enc` repeat expanded encoder

1.3.2.4.1 Index Storing Function



The index storing function is provided so that the encoder counts can be latched allowing the user to determine the position of the encoder relative to an absolute position.

The function is available only with **Field Oriented** mode.

Description:

`Encoders config`

.....

`Index Storing`

`Index Storing en`
`Int IS ctrl`
`IS ctrl src`

`Index Storing en` Function enabling parameter, as:

- `Off` function disabled
- `Storing enable` enables the capturing of the encoder count as de scribed by the setting of the control word. The control word is the value of *Int IS ctrl* or the word selected by ***IS ctrl src*** (see below for details).
- `Control Std enc` with this setting, constantly reads all the generated pulses on the standard encoder input (ex.: if encoder = 1024 pulses, 1 turn shaft = 1024 pulses).
- `Control Exp enc` same as above using expansion encoder input card

`Int IS ctrl` Internal value factory connected to ***IS ctrl src***.

Default value is: 0X0000

`IS ctrl src` Parameter to select the source Index storing command.

For example it is possible to switch the factory setting, *Int IS ctrl*, to control from another source, for example, from an SBI word or DGFC word; see table below for the corresponding values for control.

NOTE! **Digital input 7 (terminal 39) is dedicated to the use of the "Index Qualifier" (home position switch) when Index storing is enabled.**

NOTE! **Terminals 91-92 are dedicated to the use of the "Index Qualifier", if it used 6KCV301D14A4F expansion card.**

In the table are showed the values of ***IS ctrl src*** from SBI word, DGFC word or *Int IS ctrl* if:
IS ctrl src = *Int IS ctrl.*

No. bit	Name	Description	Access (Read/ Write)	Default
0-1	**-**	Not used	-	-
2	**POLNLT**	It indicates the encoder index edge polarity: 0= rising edge 1= falling edge	R/W	0
3	**-**	Not used	-	-
4-5	**ENNQUAL**	It sets the qualifier input state to activate the encoder index reading: =0, switched off when dig.input 7 = 0 =1, switched off when dig.input 7 = 1 =2, through signal = 0 =3, through signal = 1	W	0
6	**Target Enc Num**	It points out for whitch encoder the values of this parameter are reported: =0, operations requested on the Std Encoder input =1, operations requested on the Exp Encoder input	R/W	0
7	**-**	Not used	-	-
8-9	**ENNLT**	Control function of the encoder inedx reading =0, swtched off, function disabled =1, once, enables the reading of the first index signal edge only. =2, continuous, enables the reading of the index signal	R/W	0

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For the Index storing function, **the control Registers are not available via the keypad** and are to be used for the configuration and the data reading. These are:

L index register Ipa 9556
H index register Ipa 9555

In the table are showed the registers values:

Ipa	No. bit	Name	Description	Access (Read/ Write)	Default
9556	**0**	**Source Enc Num**	It indicates to which encoder is used for index storing: =0, register data are referred to the Std Encoder input =1, register data are referred to the Exp Encoder input	R	0
	1	**MP_IN**	Actual Qualifier input value (digital input 7): =0, qualifier input level is low =1, qualifier input level is high	R	0
	2-3	**STATNLT**	Status of the acquisition function; as: 0=OFF 1=Once, storing is not executed yet 2=Once, storing is already executed 3=Continuous	R	0
9555	**0-15**	**CNTNLT**	Position counter value corresponding to the index. Value is only valid when STANLT is equal to 2 or 3	R	0

indexstorpar

1.3.2.5 SpeedRegulation Gain Calc Control (SpdReg Gain Calc)

The Function is **active** only in a **Sensorless** or **Field oriented** mode. It allows Speed regulator Gain calculation. First, load inertia must be entered into the *Calc Inertia* parameter. Load inertia is either known application parameter or it can be obtained by using Speed regulator autotune procedure.

With *Calc method* parameter two gain calculation methods can be selected:

Variable bandw	resulting speed regulation bandwidth is internally selected according to the principle that bandwidth is decreased as inertia is increased and vice versa.
Fixed bandw	resulting speed regulation bandwidth is specified by parameter *Bandwidth*

NOTE! Parameters *Calc method* and *Bandwidth* are also valid for Speed regulator autotune procedure.

Description:

```
STARTUP
    Startup config
        SpdReg gain calc
            Calc method
            Calc Inertia
            Bandwidth
    Save config ?
```

`Calc method`	calculation method
`Calc Inertia`	load inertia [Kg*m2]
`Bandwidth`	speed regulator bandwidth [rad/sec]

1.3.2.6 "Constant V/F " Control (V/F Config)

Characteristics	Type of load
0	Constant torque requirement across the whole speed range
1	Mixed load between types 0 and 3
2	Mixed load between types 0 and 3
3	Load where the torque is proportional to the speed squared, e.g. fans and certain types of pump

GA6080g

Description:

```
STARTUP
    Startup config
    V/f config
    V/f voltage
    V/f frequency
    V/f shape
Save config ?
```

`V/f voltage`	Discharge starting voltage for the V/f mode
`V/f frequency`	Discharge starting frequency for the V/f mode
`V/f shape`	V/F Curve shape. It can be selected among:
	Type 0 V/f ^ 1.0 (use this selection for loads with a constant torque)
	Type 1 V/f ^ 1.5
	Type 2 V/f ^ 1.7
	Type 3 V/f ^ 2.0

1.3.2.7 Control of the Motor Overload (Overload Contr)

The Overload control function is based on a **I²t**. Three independent control types are supplied:
for the protection of the Drive, of the motor and of the BU (Brake unit) against thermal overloads.

1.3.2.7.1 I²t Protection Against a Drive Overload

The **I²t** protection on the Drive is set to allow the IEC 146 service class 2

The integrator acts according to the following formula:

$Drv\ OL\ accum\ \% = \int (I^2 - I_{CONT}^2) \cdot dt$

Where $\mathbf{I_{CONT}}$ is the direct current supplied by the Drive (consider the derating factors).

A restriction for the 0...3 Hz frequency fields is applied (see the note below)

A short overload of 200% (I2N output rated current according to IEC 146 Class 2) is possible for 0.5 seconds each 60 seconds.

The Drive protection logic reduces the current limit to the $\mathbf{I_{CONT}}$ value when the integrator times out. It is possible to configure the action of the alarm signal (see Alarm Block), default setting also causes the drip to fault.

The current limit is automatically reset when the accumulator goes back to zero.

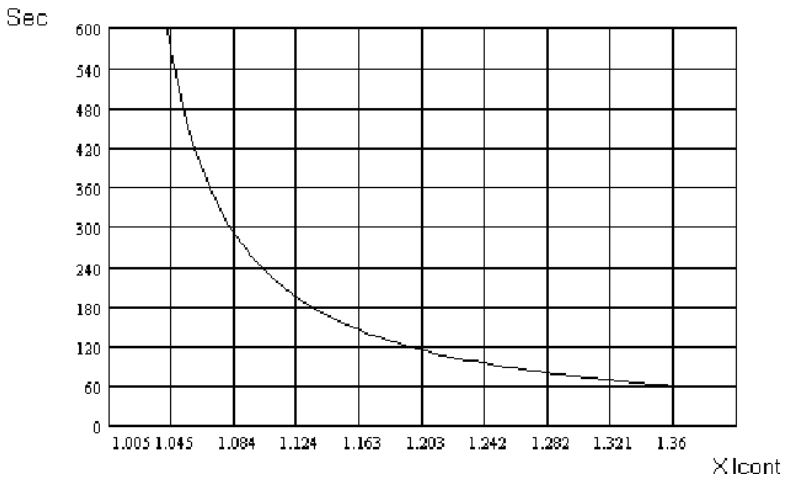
The following variables are available as digital signals:

Drv OL trip It states that the trip condition of **I²t** has been reached.

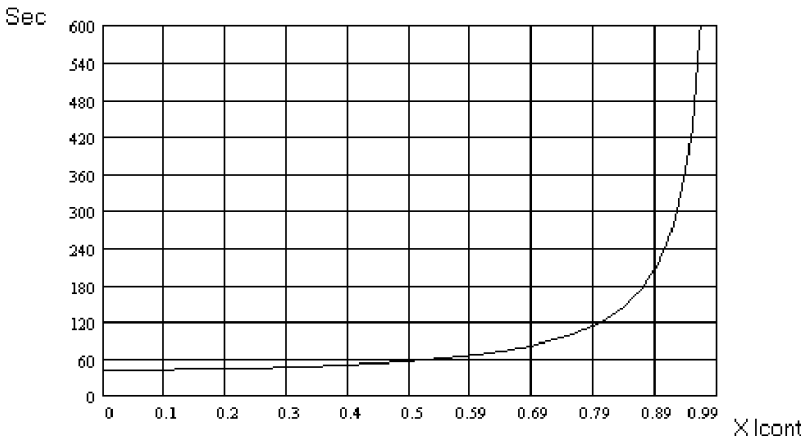
Drv OL warning It states that **I²t** has reached 90%

Drv OL accum % It states the condition, as a percentage, of the Rms current integration.
100 % = alarm level **I²t**

Overload time



Pause time



NOTE! In the 0...3 Hz output frequency range a faster **I^2t** function is active. It is tuned to reduce the current limit to I_{CONT} if an overload equal to $1.36 \cdot I_{CONT}$ is applied for a period longer than 2 seconds.

The current limit is reset when the fastest accumulator is at zero or when the output frequency overcomes a 3 Hz value.

The current limits depend on the value of I_{CONT} ($I_{2N} \cdot$ Derating factor) which is selected according to the ambient temperature, the switching frequency and the main voltage.

NOTE! **the function can not be parameterized.**

1.3.2.7.2 Motor Thermal Protection (Motor Protection)

This function is similar to the protection of the motor thermal relay controlled by the Drive. This protection states the **I^2t** typical behavior.

When the protection gets active, it is possible to generate an alarm condition.

NOTE! Some motors have a motor current (Ic) higher than the rated one (In). The service factor makes reference to the Ic/In ratio.

Description:

STARTUP
- **Startup config**
- **Motor protection**
- Service factor
- Motor OL factor
- Motor OL time

Save config ?

Service factor	Service factor
Motor OL factor	Allowed motor overload factor referring to the Motor nominal current * Service factor.
Motor OL time	Allowed overload time with a current equal to Motor OL factor

The integrator state is given by:

Mot OL accum % It gives the percentage state of the Rms current integration.
100 % = **I^2t** alarm level

It is available as a digital signal

Mot OL trip It states that the trip condition of **I^2t** has been reached. Possible or non-possible overload.

The intervention time depends on the value of the motor current as follows:

$$\text{Overload time} = \frac{(\text{Motor nominal current} * \text{Service factor} * \text{Motor OL factor})\text{^2} * \text{Motor OL time}}{(\text{Motor current})\text{^2}}$$

1.3.2.8 Enabling of the Internal Braking (ENABLE BU)

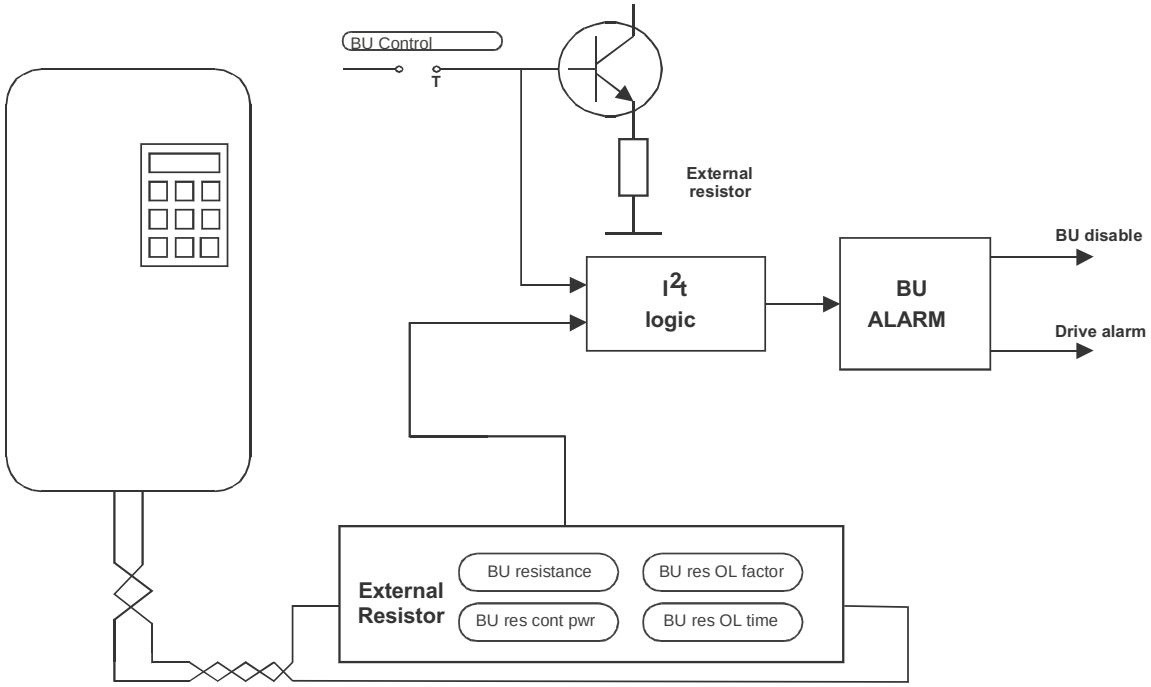


Figure 1.3.2.8.1: Braking Unit Function

1.3.2.8.1 Braking Unit Protection (BU Protection)

It controls the **I²t** Braking Unit protection function.
When the protection becomes active, it is possible to generate an alarm condition.
According to the different cases it is possible to use the device internal IGBT (Internal-External).
Overload factor = overload Power/ rated Power

Example:
DB resistance = 50 Ω
Resistor continuos Amp rating = 15A
Rated for 5 X Amps for 15 secs
Resistor short time overload rating = 5 time quarter minute (5 time continuous amps for 15 secs)
Set parameters:
Bu resistance = 50 $I^2 * R$
Bu res cont pwr = 11.25 kW ($15^2 * 50$)
Bu res OL time = 15 secs
Bu res OL factor = 25 (power = 12 R, 5 times overload current squared = 25)

STARTUP
Startup config
BU protection
BU control
BU resistance
BU res cont pwr
BU res OL time
BU res OL factor

Save config ?

BU control	BU control. Off, Internal, External
BU resistance	BU Braking resistance
BU res cont pwr	Resistance continuos power
BU res OL factor	BU allowed overload factor referring to the overload power of the braking resistance
BU res OL time	Resistance allowed overload time referring to the overload Power

The control of the external braking unit and of the resistance $\mathbf{I^2t}$ protection is indipendent of BU type (BU digital output command, comm output, on the regulation card).

1.3.2.9 In General

Load default ?	Drive reset with default data
Abort ?	Reload of the last saved database. The data set after the saving process are not stored. It is advisable to carry out a save config before entering the start up menu.
Save config ?	It saves the database. It is advisable to carry out a save config after leaving the start up menu.

1.3.3 Recipes - Import Recipe & Export Recipe

A recipe is a file where a bank of setup information can be written (Export) or read (Import)between regulation modes. Such information includes:

· Parameter index, Value.

The recipe use allows to move a parameter set among the different regulation modes or among different Drives via the PC Configurator.

The recipes present on the drive are:

· I/O config	See the excel sheet: I_O config Recipe
· Ramp & speed cfg	Ramp _ speed config Recipe
· Appl function	Appl function Appl card & comm Recipe Appl card _ comm Recipe
· User 5	Not used
· User 6	Not used
· User 7	Not used

Description:

STARTUP

    Import recipe
    Select recipe:
    Export recipe
    Select recipe:

Save config ?

Import recipe

    Select recipe: — It imports (reads) the data of the recipe

Export recipe

    Select recipe: — It exports (writes) the data of the recipe

Table 1.3.3.1: Recipe "Appl Function"

Ipa	Description	Ipa	Description
7201	PIDenable	7326	IntPIDMltPI3
7211	IntPIDinpFF	7342	PDderfilter
7212	PIDinpFFgain	7350	PIDoutsign
7230	IntPIDfbk	7351	PIDoutgain
7231	IntPIDdraw	7360	Maxdeviation
7232	IntPIDset0	7361	Positioningspd
7233	IntPIDset1	7362	Gearboxratio
7236	PIDgaindraw	7363	Dancerconstant
7237	PIDacctime	7364	Minimumdiameter
7238	PIDdectime	7210	PIDinpFFsrc
7239	PIDclampbot	7210	PIDinpFFsrc
7240	PIDclamptop	7210	PIDinpFFsrc
7263	PIsteadydelay	7210	PIDinpFFsrc
7264	PIsteadythr	7220	PIDfbksrc
7270	PIP1gain%	7220	PIDfbksrc
7271	PII1gain%	7220	PIDfbksrc
7272	PIP2gain%	7220	PIDfbksrc
7273	PII2gain%	7221	PIDdrawsrc
7274	PIP3gain%	7221	PIDdrawsrc
7275	PII3gain%	7221	PIDdrawsrc
7276	PIGPtran21hthr	7221	PIDdrawsrc
7277	PIGPtran32lthr	7222	PIDset0src
7278	PIGPtran21band	7222	PIDset0src
7279	PIGPtran32band	7222	PIDset0src
7281	IntPIGPref	7222	PIDset0src
7290	PIPinitgain	7223	PIDset1src
7291	PIIinitgain	7223	PIDset1src
7292	PIclamptop	7223	PIDset1src
7293	PIclampbot	7223	PIDset1src
7300	PDP1gain%	7226	PIDseloff0src
7301	PDD1gain%	7260	PIDPIenabsrc
7302	PDP2gain%	7261	PIDIfreezesrc
7303	PDD2gain%	7280	PIGPrefsrc
7304	PDP3gain%	7310	PDGPrefsrc
7305	PDD3gain%	7320	PIDMltPIsel0
7306	PDGPtran21hthr	7321	PIDMltPIsel1
7307	PDGPtran32lthr	7322	PIDMltPI3src
7308	PDGPtran21band	7322	PIDMltPI3src
7309	PDGPtran32band	7322	PIDMltPI3src
7311	IntPDGPref	7322	PIDMltPI3src
7324	IntPIDMltPI1	7340	PIDPDenabsrc
7325	IntPIDMltPI2	7402	DiaClcstartsrc

Appfnc

Table 1.3.3.2: Recipe "Ramp & Speed Config"

Ipa	Description	Ipa	Description
2480	Droopgain	8064	MR2fdecdltspd
2490	Droopfilter	8065	MR2fdecdlttime
2500	Drooplimit	8066	MR2accScurve
2510	Droopcomp	8067	MR2decScurve
2530	Sfbkderenable	8070	MR3accdltspd
2540	Sfbkdergain	8071	MR3accdlttime
2550	Sfbkderbase	8072	MR3decdltspd
2560	Sfbkderfilter	8073	MR3decdlttime
2580	I/Fcpenable	8074	MR3fdecdltspd
2590	Inertiacpflt	8075	MR3fdecdlttime
2600	Friction	8076	MR3accScurve
2610	Inertia	8077	MR3decScurve
7030	Intrampref1	3700	SpdP1gain%
7031	Intrampref2	3701	SpdI1gain%
7040	Intspeedref1	3702	SpdP2gain%
7041	Intspeedref2	3703	SpdI2gain%
7042	Speedtop	3704	SpdP3gain%
7043	Speedbottom	3705	SpdI3gain%
7044	Intspeedratio	3706	SGPtran21hthr
7059	Spdregenable	3707	SGPtran32lthr
7060	Mltspd0	3708	SGPtran21band
7061	Mltspd1	3709	SGPtran32band
7062	Mltspd2	3710	IntSGPref
7063	Mltspd3	3720	Spd0enable
7064	Mltspd4	3721	Intspd0ref
7065	Mltspd5	3722	Spd0Pgain%
7066	Mltspd6	3723	Spd0Igain%
7067	Mltspd7	3724	Spd0speedthr
7080	Mpotlowerlim	3725	Spd0spddelay
7081	Mpotupperlim	3726	Spd0refthr
7082	Mpotaccdltspd	3727	Spd0refdelay
7083	Mpotaccdlttim	7035	Rampref1src
7084	Mpotdecdltspd	7035	Rampref1src
7085	Mpotdecdlttim	7036	Rampref2src
7086	Mpotinitcfg	7036	Rampref2src
7087	Mpotpresetcfg	7037	Ramprefinvsrc
7097	Mpotinverskey	7050	Speedref1src
8000	Jog0	7050	Speedref1src
8001	Jog1	7051	Speedref2src
8002	Jog2	7051	Speedref2src
8003	Jog3	7052	Speedratiosrc
8004	Jogaccdltspd	7053	Speedrefinvsrc
8005	Jogaccdlttime	7071	Mltspd0src
8006	Jogdecdltspd	7071	Mltspd0src
8007	Jogdecdlttime	7072	Mltspds0src
8009	Joginverskey	7073	Mltspds1src
8021	Rampshape	7074	Mltspds2src
8030	Rhysteresisthr	7091	Mpotupsrc
8031	Rampoutenable	7092	Mpotdownsrc
8040	MR0accdltspd	7093	Mpotinverssrc
8041	MR0accdlttime	7094	Mpotpresetsrc
8042	MR0decdltspd	8014	Jog0src
8043	MR0decdlttime	8014	Jog0src
8044	MR0fdecdltspd	8015	Jogcmdsrc
8045	MR0fdecdlttime	8016	Jogsel0src
8046	MR0accScurve	8017	Jogsel1src
8047	MR0decScurve	8018	Joginverssrc
8050	MR1accdltspd	8027	Rampinput=0
8051	MR1accdlttime	8028	Rampoutput=0
8052	MR1decdltspd	8029	Rampfreeze
8053	MR1decdlttime	8090	Mltramps0src
8054	MR1fdecdltspd	8091	Mltramps1src
8055	MR1fdecdlttime	3713	SGPrefsrc
8056	MR1accScurve	3732	Spd0refsrc
8057	MR1decScurve	7054	SpdI=0src
8060	MR2accdltspd	7056	SpdPI=0src
8061	MR2accdlttime	2470	Droopensrc
8062	MR2decdltspd	2475	Droopcompsrc
8063	MR2decdlttime	2605	Inertiasrc

Rmpspd

Table 1.3.3.3: Recipe "Appl Card & Comm"

Ipa	Description	Ipa	Description	Ipa	Description
105	SLink4address	4231	DrvISBusW1src	4135	DrvDGFC-AW5src
105	SLink4address	4231	DrvISBusW1src	4136	DrvDGFC-AW6src
106	SLink4restime	4232	DrvISBusW2src	4136	DrvDGFC-AW6src
8999	SBIenable	4232	DrvISBusW2src	4136	DrvDGFC-AW6src
9020	IntDrvSBIW0	4232	DrvISBusW2src	4136	DrvDGFC-AW6src
9021	IntDrvSBIW1	4232	DrvISBusW2src	4137	DrvDGFC-AW7src
9022	IntDrvSBIW2	4233	DrvISBusW3src	4137	DrvDGFC-AW7src
9023	IntDrvSBIW3	4233	DrvISBusW3src	4137	DrvDGFC-AW7src
9024	IntDrvSBIW4	4233	DrvISBusW3src	4137	DrvDGFC-AW7src
9025	IntDrvSBIW5	4233	DrvISBusW3src	4138	DrvDGFC-AW8src
9320	IntDrvISBusW0	4234	DrvISBusW4src	4138	DrvDGFC-AW8src
9321	IntDrvISBusW1	4234	DrvISBusW4src	4138	DrvDGFC-AW8src
9322	IntDrvISBusW2	4234	DrvISBusW4src	4138	DrvDGFC-AW8src
9323	IntDrvISBusW3	4234	DrvISBusW4src	4139	DrvDGFC-AW9src
9324	IntDrvISBusW4	4235	DrvISBusW5src	4139	DrvDGFC-AW9src
9325	IntDrvISBusW5	4235	DrvISBusW5src	4139	DrvDGFC-AW9src
9326	IntDrvISBusW6	4235	DrvISBusW5src	4139	DrvDGFC-AW9src
9327	IntDrvISBusW7	4235	DrvISBusW5src		
4225	ISBusenable	4236	DrvISBusW6src		
4226	ISBusNodeID	4236	DrvISBusW6src		
4241	Heartbeattime	4236	DrvISBusW6src		
4242	ISBFAULTdelay	4236	DrvISBusW6src		
4105	IntDrvDGFC-SW0	4237	DrvISBusW7src		
4106	IntDrvDGFC-SW1	4237	DrvISBusW7src		
4107	IntDrvDGFC-SW2	4237	DrvISBusW7src		
4108	IntDrvDGFC-SW3	4237	DrvISBusW7src		
4109	IntDrvDGFC-SW4	4100	DrvDGFC-SW0src		
4129	DGFCenable	4100	DrvDGFC-SW0src		
4129	DGFCenable	4100	DrvDGFC-SW0src		
4140	IntDrvDGFC-AW0	4100	DrvDGFC-SW0src		
4141	IntDrvDGFC-AW1	4101	DrvDGFC-SW1src		
4142	IntDrvDGFC-AW2	4101	DrvDGFC-SW1src		
4143	IntDrvDGFC-AW3	4101	DrvDGFC-SW1src		
4144	IntDrvDGFC-AW4	4101	DrvDGFC-SW1src		
4145	IntDrvDGFC-AW5	4102	DrvDGFC-SW2src		
4146	IntDrvDGFC-AW6	4102	DrvDGFC-SW2src		
4147	IntDrvDGFC-AW7	4102	DrvDGFC-SW2src		
4148	IntDrvDGFC-AW8	4102	DrvDGFC-SW2src		
4149	IntDrvDGFC-AW9	4103	DrvDGFC-SW3src		
9010	DrvSBIW0src	4103	DrvDGFC-SW3src		
9010	DrvSBIW0src	4103	DrvDGFC-SW3src		
9010	DrvSBIW0src	4103	DrvDGFC-SW3src		
9010	DrvSBIW0src	4104	DrvDGFC-SW4src		
9011	DrvSBIW1src	4104	DrvDGFC-SW4src		
9011	DrvSBIW1src	4104	DrvDGFC-SW4src		
9011	DrvSBIW1src	4104	DrvDGFC-SW4src		
9011	DrvSBIW1src	4130	DrvDGFC-AW0src		
9012	DrvSBIW2src	4130	DrvDGFC-AW0src		
9012	DrvSBIW2src	4130	DrvDGFC-AW0src		
9012	DrvSBIW2src	4130	DrvDGFC-AW0src		
9012	DrvSBIW2src	4131	DrvDGFC-AW1src		
9013	DrvSBIW3src	4131	DrvDGFC-AW1src		
9013	DrvSBIW3src	4131	DrvDGFC-AW1src		
9013	DrvSBIW3src	4131	DrvDGFC-AW1src		
9013	DrvSBIW3src	4132	DrvDGFC-AW2src		
9014	DrvSBIW4src	4132	DrvDGFC-AW2src		
9014	DrvSBIW4src	4132	DrvDGFC-AW2src		
9014	DrvSBIW4src	4132	DrvDGFC-AW2src		
9014	DrvSBIW4src	4133	DrvDGFC-AW3src		
9015	DrvSBIW5src	4133	DrvDGFC-AW3src		
9015	DrvSBIW5src	4133	DrvDGFC-AW3src		
9015	DrvSBIW5src	4133	DrvDGFC-AW3src		
9015	DrvSBIW5src	4134	DrvDGFC-AW4src		
4230	DrvISBusW0src	4134	DrvDGFC-AW4src		
4230	DrvISBusW0src	4134	DrvDGFC-AW4src		
4230	DrvISBusW0src	4134	DrvDGFC-AW4src		
4230	DrvISBusW0src	4135	DrvDGFC-AW5src		
4231	DrvISBusW1src	4135	DrvDGFC-AW5src		
4231	DrvISBusW1src	4135	DrvDGFC-AW5src		

Appcard

Table 1.3.3.4: Recipe"I/O Config"

Ipa	Description	Ipa	Description	Ipa	Description	Ipa	Description	Ipa	Description
4003	StrStplogic	5062	Aninp1Xthr	4084	DO4Xsrc	2102	Word0B2src	9343	Word1B3src
4003	StrStplogic	5063	Aninp1Xscale	4084	DO4Xsrc	2103	Word0B3src	9343	Word1B3src
4004	Stopmode	5064	Aninp1Xgain	4085	DO5Xsrc	2103	Word0B3src	9343	Word1B3src
4004	Stopmode	5065	Aninp1Xlolim	4085	DO5Xsrc	2103	Word0B3src	9343	Word1B3src
4005	Jogstopctrl	5066	Aninp1Xhilim	4085	DO5Xsrc	2103	Word0B3src	9344	Word1B4src
4006	Spd0disdly	5080	Aninp2Xtype	4085	DO5Xsrc	2104	Word0B4src	9344	Word1B4src
4007	IOkeysmode	5081	Aninp2Xoffset	4086	DO6Xsrc	2104	Word0B4src	9344	Word1B4src
4007	IOkeysmode	5082	Aninp2Xthr	4086	DO6Xsrc	2104	Word0B4src	9344	Word1B4src
4010	DI0inversion	5083	Aninp2Xscale	4086	DO6Xsrc	2104	Word0B4src	9345	Word1B5src
4011	DI1inversion	5084	Aninp2Xgain	4086	DO6Xsrc	2105	Word0B5src	9345	Word1B5src
4012	DI2inversion	5085	Aninp2Xlolim	4087	DO7Xsrc	2105	Word0B5src	9345	Word1B5src
4013	DI3inversion	5086	Aninp2Xhilim	4087	DO7Xsrc	2105	Word0B5src	9345	Word1B5src
4014	DI4inversion	6010	Anout1hilim	4087	DO7Xsrc	2105	Word0B5src	9346	Word1B6src
4015	DI5inversion	6011	Anout1lolim	4087	DO7Xsrc	2106	Word0B6src	9346	Word1B6src
4016	DI6inversion	6012	Anout1scale	5011	AI1sgnsrc	2106	Word0B6src	9346	Word1B6src
4017	DI7inversion	6015	Anout2hilim	5012	AI1altselsrc	2106	Word0B6src	9346	Word1B6src
4030	DI0Xinversion	6016	Anout2lolim	5031	AI2sgnsrc	2106	Word0B6src	9347	Word1B7src
4031	DI1Xinversion	6017	Anout2scale	5032	AI2altselsrc	2107	Word0B7src	9347	Word1B7src
4032	DI2Xinversion	6020	Anout1Xhilim	5051	AI3sgnsrc	2107	Word0B7src	9347	Word1B7src
4033	DI3Xinversion	6021	Anout1Xlolim	5052	AI3altselsrc	2107	Word0B7src	9347	Word1B7src
4034	DI4Xinversion	6022	Anout1Xscale	5069	AI1Xsgnsrc	2107	Word0B7src	9348	Word1B8src
4035	DI5Xinversion	6025	Anout2Xhilim	5089	AI2Xsgnsrc	2108	Word0B8src	9348	Word1B8src
4036	DI6Xinversion	6026	Anout2Xlolim	3570	Anout1src	2108	Word0B8src	9348	Word1B8src
4037	DI7Xinversion	6027	Anout2Xscale	3570	Anout1src	2108	Word0B8src	9348	Word1B8src
4038	DI8Xinversion	6030	Anout3Xhilim	3570	Anout1src	2108	Word0B8src	9349	Word1B9src
4039	DI9Xinversion	6031	Anout3Xlolim	3570	Anout1src	2109	Word0B9src	9349	Word1B9src
4040	DI10Xinversion	6032	Anout3Xscale	3570	Anout1src	2109	Word0B9src	9349	Word1B9src
4041	DI11Xinversion	6034	Anout3xtype	3570	Anout1src	2109	Word0B9src	9349	Word1B9src
4060	DO0inversion	6035	Anout4Xhilim	3580	Anout2src	2109	Word0B9src	9350	Word1B10src
4061	DO1inversion	6036	Anout4Xlolim	3580	Anout2src	2110	Word0B10src	9350	Word1B10src
4062	DO2inversion	6037	Anout4Xscale	3580	Anout2src	2110	Word0B10src	9350	Word1B10src
4063	DO3inversion	6039	Anout4xtype	3580	Anout2src	2110	Word0B10src	9350	Word1B10src
4070	DO0Xinversion	2121	W0decompinp	3580	Anout2src	2110	Word0B10src	9351	Word1B11src
4071	DO1Xinversion	9360	W1decompinp	3580	Anout2src	2111	Word0B11src	9351	Word1B11src
4072	DO2Xinversion	4065	DO0src	4090	Anout1Xsrc	2111	Word0B11src	9351	Word1B11src
4073	DO3Xinversion	4065	DO0src	4090	Anout1Xsrc	2111	Word0B11src	9351	Word1B11src
4074	DO4Xinversion	4065	DO0src	4090	Anout1Xsrc	2111	Word0B11src	9352	Word1B12src
4075	DO5Xinversion	4065	DO0src	4090	Anout1Xsrc	2112	Word0B12src	9352	Word1B12src
4076	DO6Xinversion	4065	DO0src	4091	Anout2Xsrc	2112	Word0B12src	9352	Word1B12src
4077	DO7Xinversion	4066	DO1src	4091	Anout2Xsrc	2112	Word0B12src	9352	Word1B12src
5000	Aninp1type	4066	DO1src	4091	Anout2Xsrc	2112	Word0B12src	9353	Word1B13src
5001	Aninp1offset	4066	DO1src	4091	Anout2Xsrc	2113	Word0B13src	9353	Word1B13src
5002	AI1altvalue	4066	DO1src	4092	Anout3Xsrc	2113	Word0B13src	9353	Word1B13src
5003	Aninp1thr	4067	DO2src	4092	Anout3Xsrc	2113	Word0B13src	9353	Word1B13src
5004	Aninp1scale	4067	DO2src	4092	Anout3Xsrc	2113	Word0B13src	9354	Word1B14src
5005	Aninp1gain	4067	DO2src	4092	Anout3Xsrc	2114	Word0B14src	9354	Word1B14src
5006	Aninp1filter	4067	DO2src	4093	Anout4Xsrc	2114	Word0B14src	9354	Word1B14src
5007	Aninp1lolim	4068	DO3src	4093	Anout4Xsrc	2114	Word0B14src	9354	Word1B14src
5008	Aninp1hilim	4068	DO3src	4093	Anout4Xsrc	2114	Word0B14src	9355	Word1B15src
5020	Aninp2type	4068	DO3src	4093	Anout4Xsrc	2115	Word0B15src	9355	Word1B15src
5021	Aninp2offset	4068	DO3src	8083	Forwardsrc	2115	Word0B15src	9355	Word1B15src
5022	AI2altvalue	4080	DO0Xsrc	8084	Reversesrc	2115	Word0B15src	9355	Word1B15src
5023	Aninp2thr	4080	DO0Xsrc	153	TermStrStpsrc	2115	Word0B15src	9361	W1decompsrc
5024	Aninp2scale	4080	DO0Xsrc	9210	TermStartsrc	2120	W0decompsrc	9361	W1decompsrc
5025	Aninp2gain	4080	DO0Xsrc	9211	TermStopsrc	2120	W0decompsrc	9361	W1decompsrc
5026	Aninp2filter	4081	DO1Xsrc	154	FastStopsrc	2120	W0decompsrc	9361	W1decompsrc
5027	Aninp2lolim	4081	DO1Xsrc	156	DigEnablesrc	2120	W0decompsrc		
5028	Aninp2hilim	4081	DO1Xsrc	157	DigStrStpsrc	9340	Word1B0src		
5040	Aninp3type	4081	DO1Xsrc	2100	Word0B0src	9340	Word1B0src		
5041	Aninp3offset	4082	DO2Xsrc	2100	Word0B0src	9340	Word1B0src		
5042	AI3altvalue	4082	DO2Xsrc	2100	Word0B0src	9340	Word1B0src		
5043	Aninp3thr	4082	DO2Xsrc	2100	Word0B0src	9341	Word1B1src		
5044	Aninp3scale	4082	DO2Xsrc	2101	Word0B1src	9341	Word1B1src		
5045	Aninp3gain	4083	DO3Xsrc	2101	Word0B1src	9341	Word1B1src		
5046	Aninp3filter	4083	DO3Xsrc	2101	Word0B1src	9341	Word1B1src		
5047	Aninp3lolim	4083	DO3Xsrc	2101	Word0B1src	9342	Word1B2src		
5048	Aninp3hilim	4083	DO3Xsrc	2102	Word0B2src	9342	Word1B2src		
5060	Aninp1Xtype	4084	DO4Xsrc	2102	Word0B2src	9342	Word1B2src		
5061	Aninp1Xoffset	4084	DO4Xsrc	2102	Word0B2src	9342	Word1B2src		

I/Oconf

1.4 PARAMETER SETTINGS ON THE REGULATORS (REGULATION PARAM)

1.4.1 Regulators

According to the chosen regulation mode, some control loops could be inactive.
The following table states (with X) which are the active loops corresponding to each different mode:

Mode	**Speed loop** (Spd)	**Current loop** (Curr)	**Flux loop** (Flx)	**Speed loop** (Vlt)
V/f		*		
Sensorless (SLS)	X	X	X	X
Field Oriented (FOC)	X	X	X	X

TAV3i005

* **A pseudo-regulator, that is a circuit allowing some of the regulator protective functions, is active for the current loop with a V/f mode.**.

As for the manual tuning of the different loops, if required, see section 1.4.5 – MANUAL TUNINGS.
The settings of the **percentage** gains are carried out according to the **Basic value** stated inside the specific menu.

Description:

REGULATION PARAM	
Spd regulator	**Speed loop**
Percent values	percentage values:
SpdP1 gain %	Gain of the Proportional section as a percentage of the basic value
SpdI1 gain %	Gain of the Integral section as a percentage of the basic value
Base values	basic values:
SpdP base value	Basic value of the Proportional gain
SpdI base value	Basic value of the Integral gain
In use values	In use values:
InUse SpdP gain%	In use value of the Proportional gain. It shows the active gain in case a setting of the gain adaptive curve is required.
InUse SpdI gain%	In use value of the Integral gain.
SpdReg autotune	**Speed loop self-tuning >>**active with a FOC and SLS mode**<<**
>> Test torque ref **<<**	torque reference applicable during the self-tuning procedure [Nm]
Start ?	enabling of the data detection phase
Waiting start...	waiting time during the procedure
Results	Detected value
>> Measured Inertia **<<**	value of the measured inertia [Kg * m2]
>> Measured Frict **<<**	value of the measured friction [Nm]

Curr regulator	**Current loop**
Percent values	percentage values:
CurrP gain %	Gain of the Proportional section as a percentage of the basic value
CurrI gain %	Gain of the Integral section as a percentage of the basic value
Base values	basic values:
CurrP base value	Basic value of the Proportional gain
CurrI base value	Basic value of the Integral gain
Flux regulator	**Flux loop**
Percent values	percentage values:
FlxP gain %	Gain of the Proportional section as a percentage of the basic value
FlxI gain %	Gain of the Integral section as a percentage of the basic value
Base values	basic values:
FlxP base value	Basic value of the Proportional gain
FlxI base value	Basic value of the Integral gain
Vlt regulator	**Speed loop**
Percent values	percentage values:
VltP gain %	Gain of the Proportional section as a percentage of the basic value
VltI gain %	Gain of the Integral section as a percentage of the basic value
Base values	basic values:
VltP base value	Basic value of the Proportional gain
VltI base value	Basic value of the Integral gain

REGULATION PARAM SAVE PARAMETERS

1.4.2 Dead Time Comp

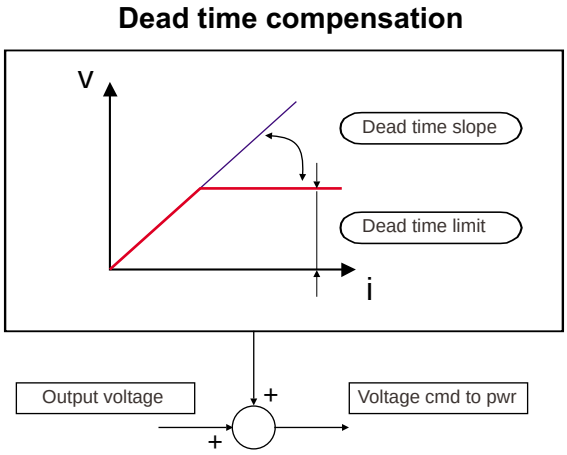
The **Dead time comp** function allows for compensation of the output voltage distortion due to IGBT voltage drop and its switching characteristics. Distortion of output voltage may cause non uniform, non smooth shaft rotation in open loop V/f control or in a closed loop Sensorless Vector control mode errors in speed estimation especially at very low speeds.Through the two parameters it is possible to set a voltage value and the compensation variation, called Gradient.

Description:

REGULATION PARAM	
Dead time comp	
Dead time limit	Value of the voltage compensation
Dead time slope	Compensation Gradient

REGULATION PARAM SAVE PARAMETERS

NOTE! Both parameters are automatically measured during CurrReg autotune procedure.



1.4.3 Function and parameterization of the V/f Control (V/f Reg Param)

1.4.3.1 V/f Regulation Control (V/f Control)

When the motor is loaded, the mechanical speed changes according to the applied load.
In order to reduce the speed error, it is possible to compensate for the motor slip.
The function parameterization allows:

- to increase the output voltage with low frequencies (voltage Boost)
- to compensate the speed change due to a load increase
- to parameterize a filter on the compensation
- to damp the DC link oscillations

The V/f mode has no current regulator.

A pseudo-regulator changes the output frequency in order to prevent the current from overcoming the set current limit.

Description:

REGULATION PARAM

V/f reg param
V/f control
Voltage boost
Slip comp
Slip comp filter
Antioscill gain
V/f ILim P gain
V/f ILim I gain

REGULATION PARAM SAVE PARAMETERS

`Voltage boost`	It increases the output voltage with low frequencies in order to compensate the voltage drop on the stator. It avoids the torque loss with a low output frequency.
`Slip comp`	It compensates the speed change due to the load increase considering the slip value.
`Slip comp filter`	Filter on the slip compensation. It avoids oscillations due to a step-load application (non-gradual).
`Antioscill gain`	It allows to damp the current oscillations between the motor and the DC link, which could be developed in the middle range of the rated speed.
`V/f ILim P gain`	Proportional gain of the pseudo-regulator
`V/f ILim I gain`	Integral gain of the pseudo-regulator

1.4.3.2 Energy Saving (V/f Save Energy)

The function allows to reduce the motor Flux in order to reduce the losses.

As a consequence it is possible to obtain an energy saving when the load requires a reduced torque as compared to the rated one (save energy).

Through the input sources it is possible to select the origin of the save energy **command** signal and of the signal stating the flux level.

The sources are:

-SE cmd src	save energy command source
-SE flx level src	source of the flux level value during the save energy

In the configurations it is possible to set via *Int SE flx level* an internal percentage value stating the flux level and via *SE flx ramp time* a ramp time on the level.

Description:

`REGULATION PARAM`
`V/f reg param`
`V/f save energy`
`Save energy src`
`SE cmd src`
`SE flx level src`
`Save energy cfg`
`Int SE flx level`
`SE flx ramp time`

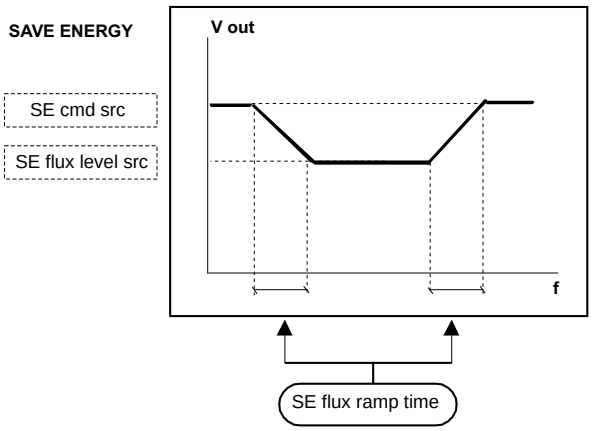
`REGULATION PARAM SAVE PARAMETERS`

`Save energy src`

`SE cmd src`	Save energy command source (see List 3)
`SE flx level src`	Source of the flux level value during save energy (see List 23)

`Save energy cfg`

`Int SE flx level`	Internal value of the flux level (standard connected to the source)
`SE flx ramp time`	Ramp time on the flux level



1.4.3.3 V/f Catch on Fly from Running on AC Input

The function allows the Drive to catch an already rotating motor, "Autocapture".
An automatic restart of the Drive is possible after a "Retrying" temporary alarm condition.
Through the ***V/f catch cmd src*** source it is possible to select the origin of the command signal enabling the function.
In the configurations the function can be parameterized according to the application.

REGULATION PARAM
V/f reg param
V/f catch on fly
V/f catch src
V/f catch cmd
V/f catch cfg
Spd search time
Vlt search time
Catch init speed
Catch demag dly
Catch retry dly

V/f catch src

V/f catch cmd	Source of the command starting the catch procedure (see List 3)

V/f catch cfg

Spd search time	It states the change of the Drive output frequency. It shows the time needed to perform a frequency change from zero to the motor rated one if the output current is equal to the motor rated one.
Vlt search time	It states the machine flux change. It shows the time needed to perform a flux change from zero to the motor rated one, if the output current is equal to the motor rated one.
Catch init speed	It states the starting speed for the synchronism search.
Catch demag dly	Delay time for the motor demagnetization before performing the synchronism search (in case the "autocapture" function is present).
Catch retry dly	Delay time for the motor demagnetization (with the "retrying" function).

1.4.3.3.1 Automatic Restart after a Temporary Alarm: Retrying

Before the autocapture process starts, it is necessary to wait for the motor to be demagnetized in order to avoid high current transient due to the E.M.F. (electromotive force) which causes Overcurrent alarms.

The demagnetizing time can be set in ms via the **Catch rety dly** parameter.

In general: the bigger the motor, the longer the time.

Too low values of Catch rety dly cause high insertion currents.

After the demagnetizing time, the speed autocaputure phase starts. This function is influenced by the **Spd search time** and **Vlt search time** parameters.

The process starts by supplying the motor with a frequency equal to the one supplied by the inverter before the alarm intervention; the machine flux is afterwards increased thus making it equal to the corresponding output frequency value (V/f feature).

If during this phase the output current is higher than the motor rated one, the output frequency is decreased and the flux increasing speed is made slower.

1.4.3.3.2 Catch on the Fly Process

The procedure is similar to the above-mentioned one; the demagnetizing time is set via the **Catch demag dly** parameter while the synchronism search starting speed via **Catch init speed** in rpm.

Example: switching of a mains (AC lines) connected motor (4 poles) (AC 50Hz) on the inverter.

- Set **Catch init speed** = 1500
- Inverter in a STOP condition
- Disconnect the motor from the mains and switch it on the inverter

WARNING! No voltage can be applied on the inverter output (terminals U2, V2, W2). No direct connection between input and output is allowed (Bypass).

Pay particular attention to the sequences of the switching contacts between the network and the inverter.

- Give the START command to the inverter

Act on the **Spd search time** and **Vlt search time** parameters as stated before.

WARNING! When this function is selected and if the power or the alarm have been reset, the drive automatically starts its normal functioning procedure. This function must be used only with applications which do not put in danger people or things during their automatic reset. Anyway, the enforced safety rules have to be taken into consideration.

1.4.4 Gain Profiling Speed Feedback in a Sensorless Mode (Sls SpdFbk Gains)

The function is active only with a **Sensorless** mode.

With a Sensorless mode the motor speed is estimated. The gains of this observer depend on the speed, on Motoring or Regen. It is possible to set a **Profile** for the gains. In both operating areas (quadrants).

Each Profile is defined by three segments:

H = High - **M** = MedPoint - **L** = Low

For each segment it is possible to state the % **P**roportional **I**ntegral gain of the speed.

Each segment is linearly connected by two **Bands** from **H** to **M**, from **M** to **L**, and by two **Levels** from **H** to **M**, from **M** to **L**.

In the configurations it is possible to set for each Profile (Motoring gains & Regen gains) the gain values and the Band and Level values common to both Profiles.

Furthermore, in order to smooth the transition between Motoring and Regen, other two parameters are used:

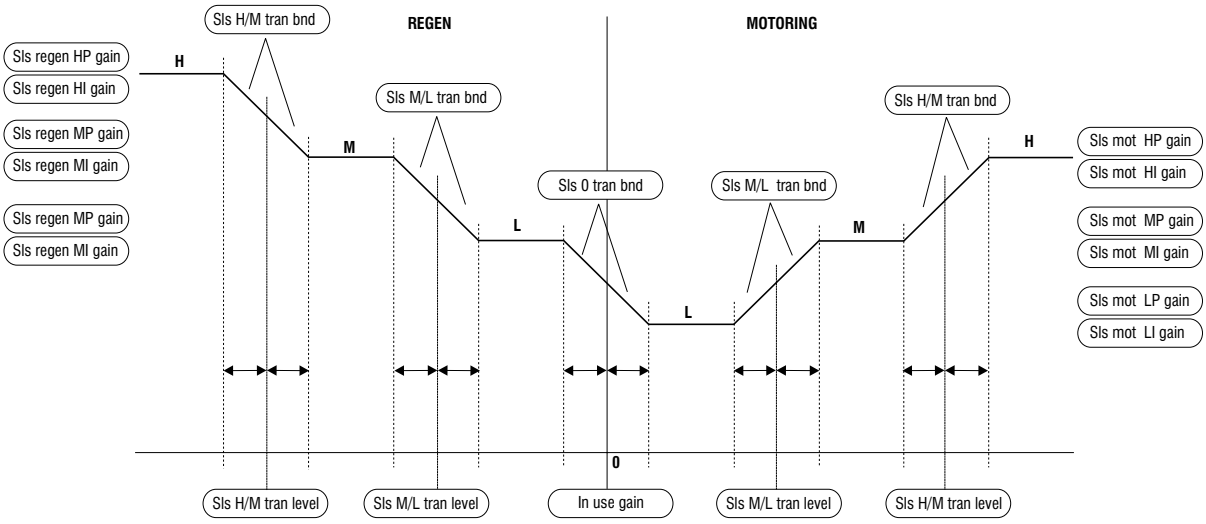
Sls 0 tran bnd band in the speed 0 neighborhood, connecting the profiles linearly; the band smoothes the change between one Profile and the other

Observer filter time constant of the first-order Filter on both gains

Description:

REGULATION PARAM

Sls SpdFbk gains	
Motoring gains	**Gains for the functioning as a motor**
Sls mot HPgain	proportional H gain
Sls mot HIgain	integral H gain
Sls mot MPgain	proportional M gain
Sls mot MIgain	integral M gain
Sls mot LPgain	proportional L gain
Sls mot LIgain	integral L gain
Regen gains	**Gains for the functioning as a Regenerator**
Sls regen HPgain	proportional H gain
Sls regen HIgain	integral H gain
Sls regen MPgain	proportional M gain
Sls regen MIgain	integral M gain
Sls regen LPgain	proportional L gain
Sls regen LIgain	integral L gain
Gain transitions	**Gain transition**
Sls H/M tran lev	level from H to M
Sls M/L tran lev	level from M to L
Sls H/M tran bnd	band from H to M
Sls M/L tran bnd	band from M to L
Sls 0 tran bnd	speed 0 band
Observer filter	filter time constant
Gain monitor	**Displaying of the in use gains**
Inuse Sls P gain	in use proportional gains
Inuse Sls I gain	in use integral gain
Observer ref mon	displaying……


Sls H/M tran bnd
REGEN
MOTORING
Sls regen HP gain
Sls regen HI gain
Sls regen MP gain
Sls regen MI gain
Sls regen MP gain
Sls regen MI gain
H
M
L
L
M
H
Sls M/L tran bnd
Sls 0 tran bnd
Sls M/L tran bnd
Sls H/M tran bnd
Sls mot HP gain
Sls mot HI gain
Sls mot MP gain
Sls mot MI gain
Sls mot LP gain
Sls mot LI gain
0
Sls H/M tran level
Sls M/L tran level
In use gain
Sls M/L tran level
Sls H/M tran level

1.4.5 Manual Tunings of Regulator Loops (Test Generator)

The automatic loops tuning (CurrentReg, FluxReg and SpeedReg autotune) is strongly recommended before to carry out any manual tuning. The manual tunings can be useful to improve the response time of the drive loops.

Using the Test generator function it is possible to carry out the manual tunings.

In the following paragraphs it is described the procedure:

- Manual tuning of the Current regulator
- Manual tuning of the Flux regulator
- Manual tuning of the Speed regulator

1.4.5.1 Test Generator Function

The tuning of the regulators is performed via an internal test signal generator in order to evaluate the regulator response. This operation requires the use of a digital oscilloscope. The "Test generator" generates signal shaped as a rectangular wave with a programmable frequency and amplitude.

For each tuning, described in the following= pararagraphs, follow the steps below.

In the `REGULATION PARAM` menu, scroll Down until **`Test generator`** command, then press Enter.

The display will show: **`Test generator`**
`Test gen mode` press Enter.

The display will show: **`Test gen mode`**
`Off` press Enter.

The display will show: **`Select new mode`**

`Off`	press Enter and scroll Down to select the regulator input on which the signal must work(see procedures):
`Off`	off
`Ramp ref 1`	Ramp reference 1
`Speed ref 1`	Speed reference 1
`Torque ref 2`	Torque reference 2
`Magn curr ref`	Magnetizzant current reference
`Flux ref`	Flux reference
`Outvlt lim`	Voltage reference

then press Enter and wait for the end of "Busy - Please wait...."message.

Press Escape two times to return **`Test gen mode`** menu.

Scroll Down to: **`Test generator`**
`Test gen cfg` press Enter.

Set the following parameters:

`Gen hi ref`	Value in count of the higher value
`Gen low ref`	Value in count of the lower value
`Gen period`	Period of the square wave

1.4.5.2 Manual Tuning of the Current Regulator

The manual tuning procedure below, can be used to change the standard response time of current regulator.

The following procedure is recomended after executing Current Regulator autotune .

Use a 2 channel digital scope.

Connect the probe of the scope, channel 1(CH1), on the **XY4/XY5** test points of the regulation card (see Hardware manual, chapter 5.3.1).

Disable the drive: press **[O]** key (red key) for 2 seconds.

In the `REG PARAMETERS/Test generator` menu set the following parameters:

`Test gen mode`	=	*Magn curr ref*
`Gen hi ref`	=	3000
`Gen low ref`	=	0
`Gen period`	=	0.1 s

NOTE! **`Gen hi ref`** value is approximate; it depends on the drive size. The setting must correspond to 20% of the Output current (This value can be verified in the **`STATUS`** menu).

Enable the drive:

terminal 12 should be active (+24V) and press **[I]** key (green key). Verify and adjust the step response of the current regulator looking the leading edge of the `Output current` (see figure: 1.4.5.2.1).

For tuning, follow the steps below:

- In the `REGULATION PARAM/Curr regulator` menu, adjust the values of **CurrP gain %** and **CurrI gain %** until the response of current is approximatly **1 ms**, without overshoot (see figure: 1.4.5.2.2); optimal response time of current regulator.
- Disable the drive: press **O** key (red key) for 2 seconds.
- Set **Test gen mode** = Off
- In the `REG PARAMETERS` menu save the settings done via the `SAVE PARAMETERS` command.

Figure 1.4.5.2.1: Output Current (Reaction Time @ 3ms) Displaying

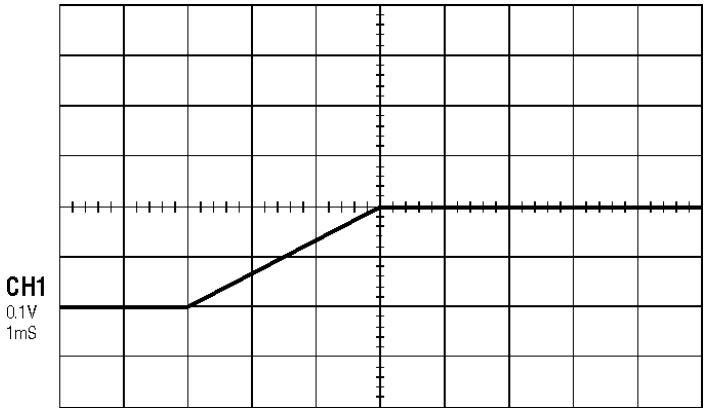
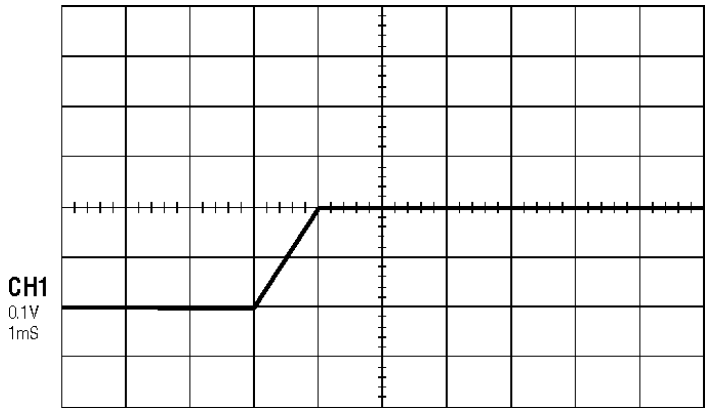


Figure 1.4.5.2.2: Optimal Output Current (Reaction Time @ 1ms) Displaying



1.4.5.3 Manual Tuning of the Flux Regulator

This tuning is necessary only with applications where the use of the field weakening is required.

Use a 2 channel digital scope.

In the `I/O CONFIG/Analog outputs/Std analog outs` menu set the analog outputs 1 & 2 (see chapter 1.1 how to connect the variables):

- ***An out 1 src*** source connect the **Flux ref** variable

- ***An out 2 src*** source connect the **Flux** variable

On **21-22** terminals (see chapter 1.3 hardware manual) place channel 1 of the digital scope (CH1) on the Flux ref (flux reference) signal; on **23-22** terminals place channel 2 (CH2) for the Flux signal (actual flux).

Disable the drive: press **[O]** key (red key) for 2 seconds.

In the `TORQUE CONFIG/Zero torque cmd` menu, set ***Zero torque cmd src*** = ONE.

In the `REG PARAMETERS/Test generator` menu to set the following parameters:

Test gen mode	=	*Flux ref*
Gen hi ref	=	Measured FluxNom · 16384 · √2
Gen low ref	=	Measured FluxNom · 0.8 · 16384 · √2
Gen period	=	0.1 s

NOTE! **Measured FluxNom** is the nominal Flux value calculated by the drive during the "FluxReg autotune"procedure; in the `SETUP MODE/FluxReg autotune` results it's possible to read this value.

In the `REG PARAMETERS/Vlt regulator/Base values` menu, set **VltP base value** parameter to its max value. This value depends by the drive size. Pressing "Shift + Help" the max value is displayed.

In the `REG PARAMETERS/Vlt regulator/Percent values` menu, set **VltP gain %** parameter to 100%.

In the `REG PARAMETERS/Flux regulator/Percent values`, set to zero the **FlxP gain % & FlxI gain %** parameters.

Enable the drive:

make sure that terminal 12 is active (+24V) and press **[I]** key (green key). On the channel CH1 the Flux ref will be displayed; on the channel CH2 the Flux signal will be displayed (see figure: 1.4.5.3.1).

For the tuning follow the steps below:

- Increase the **FlxP gain %** and **FlxI gain %** values until the Flux signal follows the Flux ref displayed (see figure: 1.4.5.3.2).
- Disable the drive: press **[O]** key (red key) for 2 seconds.
- For ***An out 2 src*** source connect the **Magn curr ref** variable.
- Enable the drive. On the channel CH1 scope the Flux ref signal will be displayed; on the channel CH2 the Magn current reference signal will be displayed (see figure: 1.4.5.3.3).

NOTE! On the CH2 signal dislayed avoid the overshoots (see figure: 1.4.5.3.4), if necessary, decreasing the **FlxP gain %** & **FlxI gain %** gains values.

- Disable the drive: press **[O]** key (red key) for 2 seconds.
- Set **Test gen mode** = Off
- Restore initial values set: **VltP base value** to zero, **VltP gain %** to zero and the source ***Zero torque cmd src*** = NULL.
- In the REG PARAMETERS menu save the new settings via the SAVE PARAMETERS command.

Figure 1.4.5.3.1: Flux Reference (CH1) and Flux (CH2) Displaying

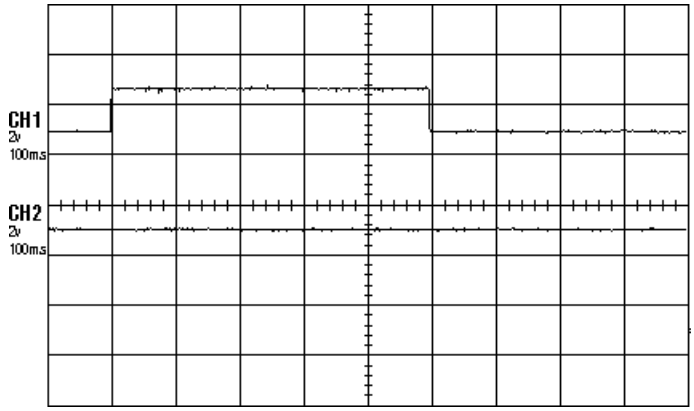


Figure 1.4.5.3.2: Flux Reference (CH1) and Tuning of Flux (CH2) Displaying

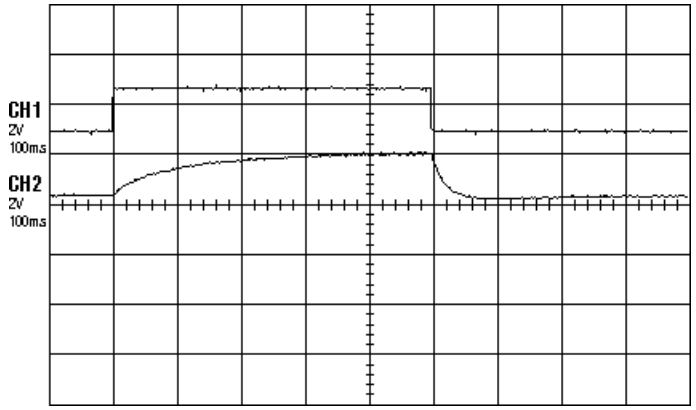


Figure 1.4.5.3.3: Flux Reference (CH1) and Tuning of Magn Current Reference (CH2) Displaying

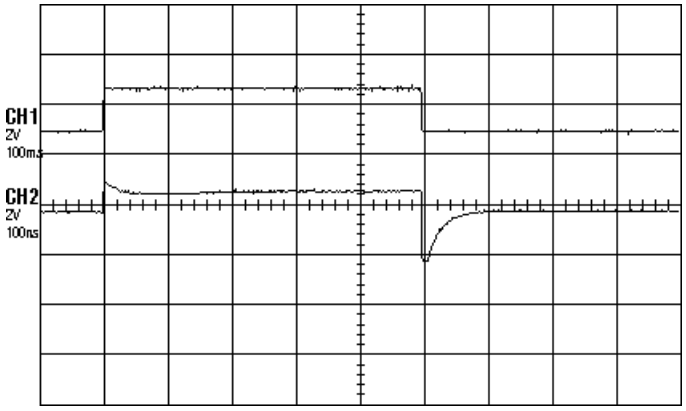
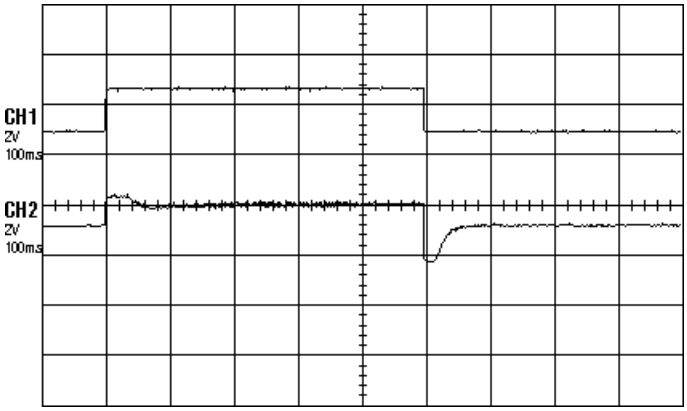


Figure 1.4.5.3.4: Flux Reference (CH1) and Magn Current Reference, with Overshoots, (CH2) Displaying



1.4.5.4 Manual Tuning of the Speed Regulator

The manual tuning procedure below, can be used to improve the response of Speed regulator.
The following procedure is recommended after Speed Regulator autotune.

NOTE! The tuning requires free motor shaft rotation with the load applied.

Use a double trace digital scope.
In the `I/O CONFIG/Analog outputs/Std analog outs` menu set the analog outputs 1 & 2 (see chapter 1.1 how to connect the variables):
- ***An out 1 src*** source connect the **Speed re**f variable
- ***An out 2 src*** source connect the **Norm speed** variable

On **21-22** terminals (see chapter 1.3 hardware manual) connect channel 1 of the digital scope (CH1) to the Speed ref (speed reference) signal; on **23-22** terminals place channel 2 (CH2) for the Norm speed signal.

Disable the drive: press **[O]** key (red key) for 2 seconds.

In the REG PARAMETERS/Test generator menu set the following parameters:

Test gen mode	=	*Speed ref 1*	
Gen hi ref	=	3200	(≈ 20% in count of the "Full Scale Speed")
Gen low ref	=	0	
Gen period	=	2 s	

Enable the drive:

make sure that terminal 12 is active (+24V) and press **[I]** key (green key). On the channel CH1the "Speed ref" will be displayed; on the channel CH2 the "Norm speed" will be displayed.

For the tuning follow the steps below:

- In the REGULATION PARAM/Spd regulator/Percent values, adjust the values of **SpdP1 gain %** and **SpdI1 gain %** until the "Norm speed" signal follows the "Speed ref " displayed (see figure:1.4.5.4.1); tune to havesmall overshoot (see figure: 1.4.5.4.2)

NOTE! If necessary in the REG PARAMETERS/Spd regulator/Percent values menu, increase the speed base values gains: **SpdP base value** & **SpdI base value**.

- Disable the drive: press **[O]** key (red key) for 2 seconds.
- Set **Test gen mode** = Off
- In the REG PARAMETERS menu save the settings done via the SAVE PARAMETERS command.

Figure 1.4.5.4.1: Speed Ref1 (CH1) and Norm Speed (CH2) Displaying

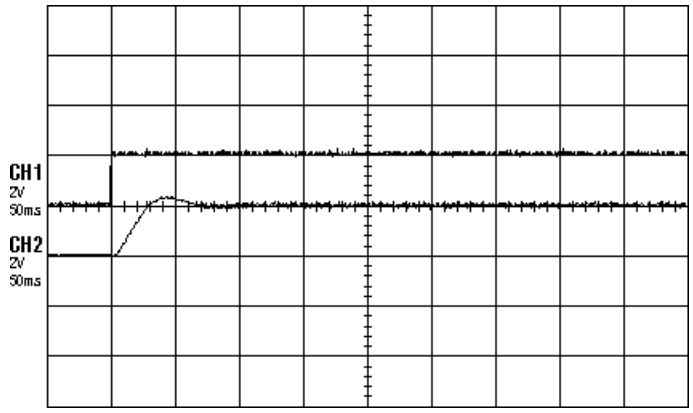
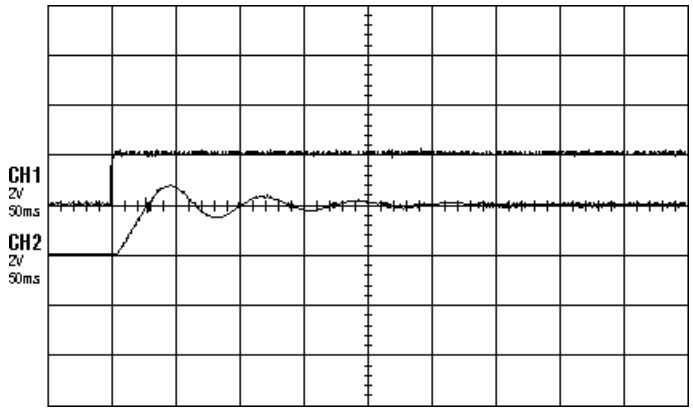


Figure 1.4.5.4.2: Speed Ref1(CH1) and Norm Speed (CH2), with Overshoot, Displaying



1.5 COMMAND CONFIGURATION (I/O CONFIG)

1.5.1 Definition of the Commands

For starting, the drive always requires the Enable command, Start command and Fast stop when enabled.

The above different commands affect the drive rotation:

Enable - this command unlocks power converter firing. It is made of a terminal wired permissive that affects firing hardware directly. In addition, this can be optionally ANDed with a boolean input "Digital enable" from an external source (communication, application card). Enable command can also be "gated" by the "En/Disable control function" as described below. Enable unsuicides the drive regulators and current can circulate. See Diagram Block chapter , "Commands - Enable logic".

Start/Stop - this command unlocks the reference to the regulation chain: Ramp, speed regulator or torque regulator, depending on which is enabled. When the command is asserted (0 to 1 transition) it is said that the drive is being "started", when the command is negated (1 to 0 transition) it is said that the drive is being "stopped".

The Command select parameter defines the use of Enable drive and start/stop of the drive. It may have different source:

- **Terminal**: Enable and Start and Stop commands are active from programmable digital input terminals. Enable has a dedicated input, Start is programmed as default as *Term Str/Stp src* (Start & Stop can also be separate commands from PB inputs). If the command source id Digital or I O Keys, terminals are acting as permissive inputs.
- **Digital**: The commands comes as boolean input "Digital Start/Stop" from a communication or application card. (Terminals are acting as level sensitive permissive inputs)
- **[I]** and **[O]** keys on the keyboard/display module. (Terminals are acting as level sensitive permissive inputs)

Through "Terminal" and "Digital" can be select an "edge-sensitive" section, which is meant for manual control from an operator, or automatic control from a PLC, and a "level-sensitive" section, which is meant for wired control in an unmanned installation where automatic restart after power fault is desired.

For unmanned installations requiring the drive to restart after a power fault without any external sequencer logic, the edge sensitive section may be bypassed by setting parameter ***Command select*** = *"Terminal Level"*. See Diagram Block chapter , "Commands - Start Stop logic".

NOTE! With ***Command select*** = *"I O Keys"*, the **[O]** key on the keyboard/display module (if present) can be used to stop the drive. In this case, to resume normal operation, the **[I]** key must be pressed, alternatively power must be cycled in orded to clear the sequencer. The keyboard/display module can be used as a monitor device with the different selection of ***Command select*** parameter.

Fast stop - usage of this command is optional. This command is used when the drive is operated with Ramp and speed regulation. When the command is active, the Ramp input reference is zeroed and the ramp operates on a specific deceleration slope that can be set independently from the standard deceleration slope. The command can be accessed either from a communication source or a programmable digital input terminal.

NOTE! when Fast stop command is negated, the drive will restart unless also Start/Stop command has been negated. The exception is when ***En/Disable control*** parameter is programmed as

"Stop/Fs&Spd=0". In this case the Start command must be recycled after Fast stop is no more active in order to let the drive to start again.

Jog - this command provides momentary rotation of the drive with ramp and speed reference settings independent of the ones defined for operation with Start/stop command.

NOTE! Start/Stop command takes priority over the Jog command. The Jog command can be activated by concurrent sources: the **[+/Jog]** key on the keyboard, and a boolean source that can be either a communication or application card or a programmable digital input. The Jog command is complemented by a toggle command for rotation direction inversion. The source of inversion may also be a dedicated key on the keyboard/display module or a configurable source, both sources may be concurrently active.

NOTE! Due to the double function of the keys, it is initially necessary to hit **[Shift]** and **[+/Jog]** in order to turn the keyboard section into jog mode. After that, the simple pressure of **[+/Jog]** key will cause the drive to jog, and the pressure of the **[-/<->]** key will cause inversion of the rotation. To exit keyboard jog mode press **[</Escape]**.

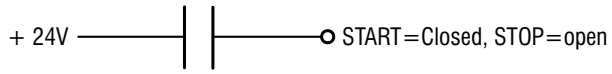
1.5.2 Command Block (Commands)

The command Block, via the input sources, allows to select the signal origin to control:

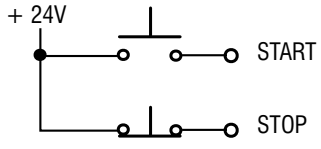
- ***Term enable src*** command source for the terminal strip Enable
- ***Term StrStp src **** source of the Start (1) command and of the terminal strip Stop (0) command
- ***Term Start src **** command source for the terminal strip Start
- ***Term Stop src **** command source for the terminal strip Stop
- ***Dig enable src*** digital Enable command source
- ***Dig StrStp src*** source of the Start (1) command and of the digital Stop (0) command.
- ***FastStop src*** Fast Stop command source

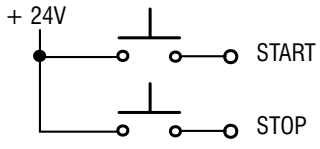
(*****) The start and stop command can be controlled, as an alternative, via:

· **A single terminal** In this case (+24) 1 refers to the Start and (open) 0 to the Stop



· **Two terminals connected with buttons** In this case the change of state is caused by the positive front (0 to1) on the terminal.





NOTE! For factory setup see section 1.5.3.1

NOTE! DI0, enable input, terminal point 12, has to be open to change parameter COMMANDS SELECT from the keypad or toolbox.

Description:

```
I/O CONFIG
 Commands
    Commands src
        Term StrStp src
        Term Start src
        Term Stop  src
        Dig Enable src
        Dig StrStp src
        FastStop src
I/O CONFIG   SAVE PARAMETERS
```

In the Block configurations it is possible to set the following parameters:

- Command select	Logic for the Start/Stop Edge or Level sensitive signal
Terminal level	The drive is controlled via terminal strip using the level sensitive mode
Terminal edge	The drive is controlled via terminal strip using the edge sensitive mode
Digital level	The drive is controlled from a communication or application card using the level sensitive mode
Digital edge	The drive is controlled from a communication or application card using the edge sensitive mode
I/O keys	The drive is controlled from the keyboard using the I O keys
- En/Disable mode	Action time to the stop condition. Setting of this parameter is not allowed while terminal enable is active. The drive can act: · With the enable and start/stop commands controlled independently by the operator (*En/Disable mode* = Off) · With just the start/stop command, while the enable and disable command is controlled by the drive. In this case with the start command the drive enables itself. When the stop command is generated (and/or fast stop according to the *En/Disable mode* selection), the Drive reaches a zero speed and after a *Spd 0 dis dly* time, it disables itself automatically (for more details see section 1.5.2.1.).
- Spd 0 dis dly	Delay time between the zero speed and the disabling procedure

Description:

```
I/O CONFIG
    Commands
        Commands cfg
            Command select
            En/Disable mode
            Spd 0 dis dly
```

The monitor menu displays:

Enable cmd mon	it displays the Enable command state
Start cmd mon	it displays the Start command state
FastStop cmd mon	it displays the Fast Stop command state

```
Commands mon
     Enable cmd mon
     Start cmd mon
     FastStop cmd mon
```

1.5.2.1 Enable/Disable Control Function

The interaction of the different commands may be affected by a **"En/Disable mode"** logic function. This function may provide gating of the enable command with the Start/Stop of Fast Stop commands and the value of speed. The purpose of this function is to defer actuation of the power bridge to the time the drive is required to actually start, and terminate the actuation once drive stop has been commanded and the drive has come to a stop. The operation mode is controlled by parameters ***En/Disable mode*** [4004] according to these criteria:

En/Disable mode *= "Off" [0]* Enable actuation (Power converter firing) is independent from Start/stop, Fast Stop or Jog commands.

En/Disable mode *= "Stop/ FS & Spd=0" [1]*

Enable actuation is initiated when the Start/Stop command is asserted and the Fast stop is not asserted. Enable actuation is terminated after:

Start/Stop is negated OR Fast Stop is asserted, AND

speed feedback has reached the value specified in parameter ***Spd 0 speed thr*** [3724], AND

the delay specified in parameter ***Sped 0 dis delay*** [4006] has elapsed.

NOTE! to enable again the drive, Fast stop must not be asserted and the Start/Stop must be recycled

1.5.3 Typical Command Configurations

1.5.3.1 Control from Keyboard/Display Module (Factory Setting)

Command select *= "I O Keys"*

The drive comes with a setup meant for control from the keboard/display unit, with the mandatory Terminal Enable permissive. En/Disable control logic and Jog are active. No input is set for Fast stop command. Parameters are set as per following table. The drive behaviour is described below.

At power up, the power converter firing will not be initiated even if Terminal Enable is asserted (driven high).

Once Terminal Enable is asserted, no actuation occurrs until the **[I]** key is pressed. When **[I]** key is pressed, the power converter firing is initiated, Motor magnetization sequence is executed, then Ramp and speed regulation are unlocked.

When **[O]** key is pressed, the drive is stopped, and after the programmed delay, power converter firing is terminated.

Negating Terminal Enable will terminate converter firing at any time, and the motor will coast to a stop.

Table 1.5.3.1-1: Setup for Control from Keyboard (Factory Setup)

Parameter description	Index	Value	Comments
Command select	4002	*Stop/FS & Spd=0*	
En/Disable mode	4004	*I O keys*	
Dig Enable src	0156	*Do not care*	This source bypassed (AND logic)
Term StrStp src	0153	*"DI 1 mon"*	This source bypassed (AND logic)
Dig StrStp src	0157	*Do not care*	This source not used
Term Start src	9210	*Do not care*	This source not used
Term Stop src	9211	*Do not care*	This source not used
FStop src	0154	*"NULL"*	Fast stop not used
Jog cmd src	8015	*"NULL"*	Jog from the keyboard
Jog invers src	8018	*"NULL"*	Jog inversion from the keyboard
Spd 0 dis dly	4006	1000 msec	
Spd 0 speed thr	3724	10 rpm	

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1.5.3.2 Control from Remote Pushbuttons

Command select *= "Terminal edge"*

This setup is useful for simple, standalone installations where no PLC is used and the external relay logic is minimal.

The keyboard/display module is not required, a LED module can be used instead. Momentary action pushbuttons are used for Start, Stop, Jog and Jog inversion, with the mandatory Terminal Enable permissive.

En/Disable control logic and Jog are active.

No input is set for Fast stop command.

Parameters can be set as per example in table 1.5.3.2-1.

Complete wiring information for digital inputs may be found in the hardware reference section. The drive behaviour is similar to the one for keyboard control (sect. 1.5.3.3.1), but for the fact that the four remote wired pushbuttons replace the corresponding keys on the keyboard.

Of course there is no need to use a **[Shift]** button as remote buttons do not have multiple functions.

Table 1.5.3.2-1: Example Setup for Pushbutton Control

Parameter description	Index	Value	Comments
Command select	4002	*Terminal edge*	
En/Disable mode	4004	*Stop/FS & Spd=0*	
Dig Enable src	0156	*Do not care*	This source bypassed (AND logic)
Term StrStp src	0153	*"NULL"*	This source bypassed (AND logic)
Dig StrStp src	0157	*Do not care*	This source not used
Term Start src	9210	*"DI 1 monitor"*	Tie Start button to terminal 13
Term Stop src	9211	*"DI 2 monitor"*	Tie Stop button to terminal 14
FStop src	0154	*"NULL"*	Fast stop not used
Jog cmd src	8015	*"DI 3 monitor"*	Tie Jog button to terminal 15 (Jog used)
Jog invers src	8018	*"DI 4 monitor"*	Tie Jog invert button to terminal 36 (Jog used)

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1.5.3.3 Control from a LAN, Usage of Fast Stop

Command select *= "Digital level"*

This setup represents one possible example for system applications.

The keyboard/display module is not required.

A LAN interface card is used to send commands from a PLC to the drive, with the mandatory Terminal Enable permissive.

En/Disable control logic is not active: enable sequencing is controlled from the LAN. Jog is controlled from the keyboard, when present.

Fast stop command is used for Emergency Stop, employing a digital input for redundancy to the LAN system. Parameters can be set as per example in following table.

Complete wiring information for digital inputs may be found in the hardware reference section. The drive behaviour is described below.

At power up, the power converter firing will not be initiated even if Terminal Enable is asserted (driven high).

Once Terminal Enable is asserted, no actuation occurs until the Digital enable from the LAN is asserted. When the latter is asserted, the power converter firing is initiated and Motor magnetization sequence is executed.

The LAN asserts Start/Stop command to unlock Ramp and speed regulation. The **[I]** key of the keyboard, if present, has the same effect.

When Start/Stop command is negated, the drive is stopped, but regulation remains active at zero speed. This way tension on processed material can be maintained.

Negating Terminal Enable will terminate converter firing at any time, and the motor will coast to a stop.

Table 1.5.3.3-1: Example Setup for LAN Control with Wired Fast Stop

Parameter description	Index	Value	Comments
Command select	4002	"*Digital level*"	
En/Disable mode	4004	"*Stop FS & Spd=0*"	
Dig Enable src	0156	"*B0 W1 decomp*"	Bit 0 of bitmapped input Word 1
Term StrStp src	0153	"*ONE*"	This source bypassed (AND logic)
Dig StrStp src	0157	"*B1 W1 decomp*"	Bit 1 of bitmapped input Word 1
Term Start src	9210	*Do not care*	This source not used
Term Stop src	9211	*Do not care*	This source not used
FStop src	0154	"*DI 1 monitor*"	tie Fast stop input to term 13
DI 1 inversion	4011	"*Inverted*"	Safety critical function requires negative logic
Jog cmd src	8015	"*NULL*"	Jog is commanded from the keyboard
Jog invers src	8018	"*NULL*"	Jog inversion is commanded from the keyboard
SBI enable	8999	"*Enabled*"	enable operation of LAN interface
W1 decomp src	9361	"*SBI Drv W0 mon*"	first incoming process data channel from LAN

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1.5.4 Unmanned Installation

Command select *= "Terminal level"*

This setup represents an example for applications like remote pumping stations, where external logic may be minimal, and it is required for the drive to restart automatically after a power fault.

The keyboard/display module is not required.

Terminal Start/Stop is used to control the drive, with the mandatory Terminal Enable permissive. En/Disable control logic is active, in order to have the drive disabled when stopped. Although possible when keyboard is present, Jog is normally not used. Fast stop command is not used. Parameters can be set as per example in table following. Complete wiring information for digital inputs may be found in the hardware reference section. The drive behaviour is described below.

At power up, the power converter firing and Ramp/speed regulation may be initiated if Terminal Enable and Terminal Start/Stop are asserted (driven high).

Once Terminal Enable is asserted, no actuation occurs until the Terminal Start/Stop is asserted. When this occurs, the power converter firing is initiated, Motor magnetization sequence is executed, then Ramp and speed regulation are unlocked.

When terminal Start/Stop is negated, the drive is stopped, and after the programmed delay power converter firing is terminated.

Negating Terminal Enable will terminate converter firing at any time, and the motor will coast to a stop.

After a power fault, if Terminal enable and Terminal Start/Stop do not change, the drive will restart at power up.

Table 1.5.3.4-1: Example Setup for Unmanned Installation

Parameter description	Index	Value	Comments
Command select	4002	"*Terminal level*"	
En/Disable mode	4004	"*Stop/FS & Spd=0*"	
Dig Enable src	0156	*Do not care*	This source bypassed (AND logic)
Term StrStp src	0153	"*DI 1 monitor*"	Tie Start/Stop signal to terminal 13
Dig StrStp src	0157	*Do not care*	This source not used
Term Start src	9210	*Do not care*	This source not used
Term Stop src	9211	*Do not care*	This source not used
FStop src	0154	"*NULL*"	Fast stop not used
Jog cmd src	8015	"*NULL*"	Jog from the keyboard
Jog invers src	8018	"*NULL*"	Jog inversion from the keyboard

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1.6 CONFIGURATION OF THE ANALOG AND DIGITAL INPUTS/OUTPUTS (I/O CONFIG)

The **Drive**, in its **standard** version on the regulation card, has at its disposal the following analog/digital I/Os:

3 analog inputs (terminals:**1-2**, **3-4**, **5-6**), configured as voltage or current differential inputs.

2 voltage analog outputs (terminals: **21-22-23**), with a common reference potential.

8 digital inputs (terminals: **12-13-14-15**, **36-37-38-39**), with a common reference potential and a galvanic isolation.

4 digital outputs (terminals: **41-42**, **80-82, 83-85**), with a common reference potential, a common power supply and galvanic isolation.

NOTE! see chapter 1.3 in the Hardware Guide.

Other analog and digital I/Os are available by using the **EXP….** expansion cards.

1.6.1 Analog Input Block (Analog Inputs)

The **2** Block sources allow to select the origin of the command signals for the following functions:

Analog input 1 sign src allows the inversion of the output signal, ***Analog input 1 alt sel src*** allows the selection of an alternative output reference.

In the configurations it is possible to perform the *self-tuning of the offset and of the gain* on the input, to modify the input *filter time constant*, to set the input *multiplicative factor* (+1 or –1).

The upper and lower limit of the output signal can be set via the **hi lim** and **lo lim** parameters.

This function is shown in the figure of the following page.

· The Block has a sampling time of 2 msec. The resolution is: 10V=2047 counts.

The inputs of this Block are:

· Analog input 1 sign src
· Analog input 1 alt sel src

The outputs:

· Analog input 1 output
· Analog input 1 < thr

The following description of the parameters **of the standard analog input 1** is valid also for the analog inputs 2 and 3.

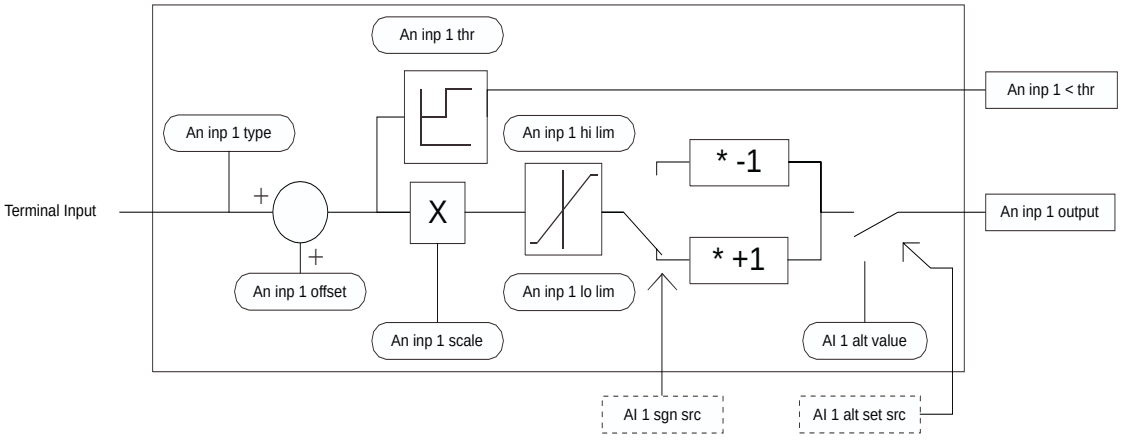
Description:

```
I/O CONFIG   Analog inputs
         Std analog inps
             Analog input 1
                 An inp 1 src
```

```
        AI 1 sgn src
        AI 1 alt sel src
    An inp 1 cfg
        An inp 1 type
        AI 1 alt value
        An inp 1 thr
        An inp 1 scale
        An inp 1 filter
        An inp 1 lo lim
        An inp 1 hi lim
        AI 1 offs tune    Start ?
        AI 1 gain tune    Start ?
    An inp 1 mon
        An inp 1 output
        An inp 1 < thr
        An inp 1 offset
        An inp 1 gain
```

I/O CONFIG SAVE PARAMETERS

The Block of the **Analog input 1** is shown in the figure below (it is valid also for the input 2 and 3).



An inp 1 src

`AI 1 sgn src` — It connects the selected signal to the selector of the multiplier input: if the signal is 0, multiply by +1, or if the signal is 1, multiply by -1.

`AI 1 alt sel src` — It connects the selected signal to the selector of the alternative reference.

An inp 1 cfg

`An inp 1 type` — It allows selection of the input type (+/- 10V, 0-10V… …0-20mA, 4-20mA).

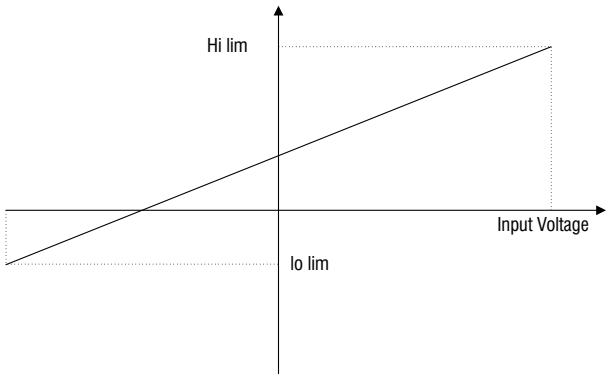
`AI 1 alt value` — Alternative reference value in count.

`An inp 1 thr` — Input threshold value in count.

An inp 1 scale		Scale factor of the input.
An inp 1 filter		Time constant of the input filter.
An inp 1 lo lim		Upper limit of the Block output in count (see figure).
An inp 1 hi lim		Lower limit of the Block output in count (see figure).
AI 1 offs tune	Start ?	Autotune command for the input offset. Input automatic fine-tuning.
AI 1 gain tune	Start ?	Autotune command for the input gain. Conditions containing an offset can be compensated.
An inp 1 mon		
An inp 1 output		Monitor for the Block output value.
An inp 1 < thr		Monitor for the threshold compensator state (1 the condition is true)
An inp 1 offset		Monitor for the offset value
An inp 1 gain		Monitor for the gain value

The figure below shows the **function** of the **lo and hi lim** parameters. The input voltage, after the offset and gain compensation, supplies on the output a linear value included between *lo lim* and *hi lim*. The two parameters can assume any value with the restriction of:

lo lim lower than **hi lim**



NOTE! it is important to remember that the hardware configuration on the regulation card has to be set according to the selected input.

Analog inputs	Input signal	
	-10V…+10V	0-20mA
	0-10V	4-20 mA
Analog input 1	S8 = OFF	S8 = ON
Analog input 2	S9 = OFF	S9 = ON
Analog input 3	S10 = OFF	S10 = ON

TAVyS06

ON Jumper **OFF** Jumper

- 10V… +10V input connects a signal with a maximum voltage of +/-10V.
The change in the motor rotation direction is obtained according to the signal polarity.
Input voltage > 10V or >-10V cause saturation of the count value.

0 – 10V, 0 – 20mA on the input it is possible to connect a maximum voltage of +10V or a 0…20mA current signal. The signal must always have a positive sign, through which, if used as a reference, it is possible to change the motor rotation direction via **AI 1 sgn src**.

4 –20 mA on the input it is possible to connect a 4… 20mA current signal. The signal must always have a positive sign through which, if used as a reference, it is possible to change the motor rotation direction via **AI 1 sgn src**. Through the An inp X <thr output it is possible to state if the current signal is lower than the one of the set threshold. If the current is <= 4mA , the output supplies a signal (error signal). This, for example, can be combined with a digital output.

How to perform the **self-tuning procedure of the analog input** via the **Menu**:

I/O CONFIG ↵
▼
Analog inputs ↵ ↵ = enter
Std analog inputs 1 ↵
▼

An inp 1 cfg ↵

AI offs tune (autotune offset)
Start? Set the potentiometer at zero, then ↵

When the operation has been performed,
the following operator message is displayed: **Autotune**
End to cancel the message press ◄
▼
An inp gain tune (gain autotune)
Start? Set the potentiometer with the maximum value, then ↵
When the operation has been performed,
the following operator message is displayed: **Autotune**
End to cancel the message press ◄
Go back to the main menu, **I/O CONFIG**, by pressing Escape, then press ↵
press ▼ several times till **SAVE PARAMETERS** has been reached, then press ↵ to save the settings.

In the **Analog input 1 mon** submenu it is possible to monitor the values of the calculated *offset* and *gain*.

1.6.2 Analog Input Block for 1x and 2x Expansion Cards (Exp Analog Inputs 1X & 2X)

This Block refers to possible Option Expansion cards. See the considerations listed in the previous paragraph, including the parameter description. The points of difference are:

- No input filter is present
- No alternative reference can be selected (the analog input 1alt sel src is missing)
- The Block has a sampling time of 8 msec

The inputs of this Block are:

- Analog input 1X sign src

The outputs:

- Analog input 1X output
- Analog input 1X < thr

Description:

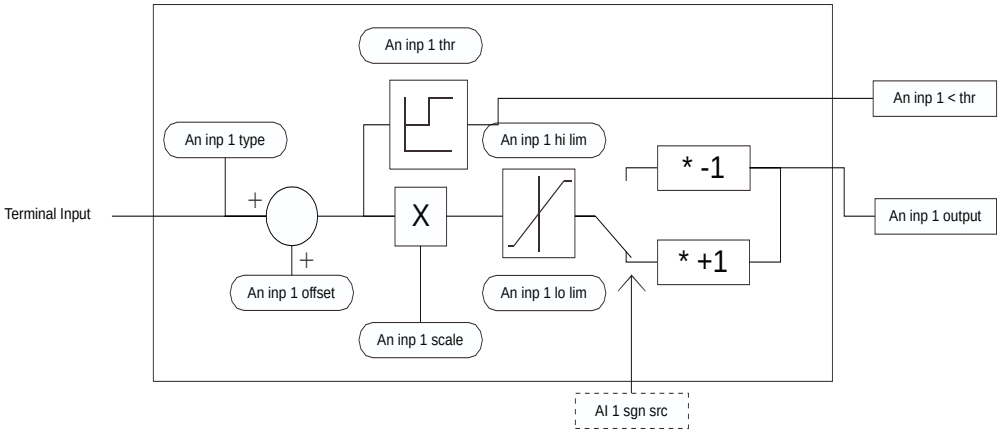
- Anolog input 1X output
- Analog input 1X < thr

```
I/O CONFIG   Analog inputs
        Exp analog inps
            Analog input 1X
                An inp 1X src
                    AI 1X sgn src

                An inp 1X cfg
                    An inp 1X type
                    An inp 1X thr
                    An inp 1X scale
                    An inp 1X lo lim
                    An inp 1X hi lim
                    AI 1X offs tune   Start ?
                    AI 1X gain tune   Start ?
                An inp 1X mon
                    An inp 1X output
                     An inp 1X < thr
                    An inp 1X offset
                    An inp 1X gain

I/O CONFIGSAVE   PARAMETERS
```

The Block of the expanded analog input 1X and 2X is shown in the figure below.



The Block and parameter description is valid also for **Analog input 2X**.

In order to obtain two physical analog inputs, the use of an **EXP…** option card is required.

1.6.3 Analog Output Block (Analog Outputs)

The Blocks of the analog outputs allow to turn a voltage internal signal **(or a current signal** if the EXP-D20A6 option card is used) into a signal available on the terminal strip. As with the analog inputs, there are a series of standard outputs on the drive, referred as **Std,** and a series of outputs available on the expansion cards, referred as **Exp** with the "X" suffix. It is possible to obtain **4** expanded analog outputs: **1X**, **2X**, **3X** and **4X**.

Their use requires an enabling procedure (**enable** / **disable**).

Note! Each analog output has its menu of **src**, **cfg** and **mon** (source, configuration and monitor).

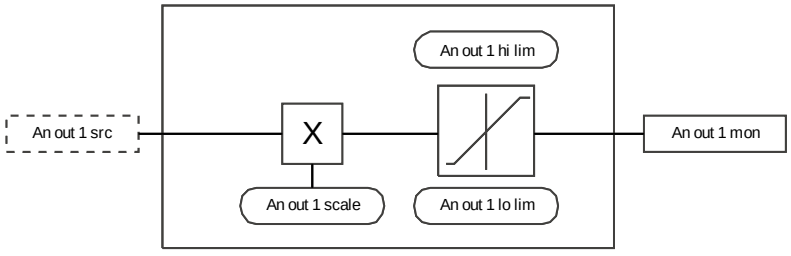
The input of this Block is:

· Analog output 1 src

Description:

```
I/O CONFIG   Analog outputs
             Std analog outs
                 Analog output 1
                     An out 1 src
                         An out 1 src
                     An out 1 cfg
                         An out 1 scale
                         An out 1 hi lim
                         An out 1 lo lim
                     An out 1 mon
                         An out 1 mon
                     Exp ana out en
                         Analog output 1X
                         Analog output 2X
                         Analog output 3X
                         Analog output 4X
                         Exp ana out en
I/O CONFIG       SAVE PARAMETERS
```

The analog output Block is shown in the figure below.



An out 1 src	
An out 1 src	It connects the selected signal to the Block input
An out 1 cfg	
An out 1 scale	Scale or multiplicative factor of the Block
An out 1 hi lim	Count value aimed at obtaining +10V. Value must be higher than zero.
An out 1 lo lim	Count value aimed at obtaining -10V. Value must be lower than zero.
An out 1 mon	
An out 1 mon	Monitor for the output value in count
Exp analog outs en	
Analog output 1X	Source, Configuration and Monitor of the Analog output 1X
.....	.....
Analog output 4X	Source, Configuration and Monitor of the Analog output 4X
Exp ana out en	Enabling of the expanded analog outputs.

1.6.4 Digital Input Block (Digital Inputs)

The Blocks of the digital inputs allow to turn a signal available on the terminal strip into an internal signal. As described before, the output of the Blocks is included in the lists for the selection of the different sources (src). The Block *function* allows to **invert the signal** on the terminal strip.

For example, if the potential available on the terminal strip is +24V, and the inversion is disabled (***not inverted***) the input state is 1 (*one*), standard configuration; if the inversion is enabled (***inversion***) the input state is 0 (*null*).

The Drive is supplied with **8 standard digital** programmable **inputs,** referred as **Std**. The Drive ENABLE is set on the Digital input 0; such condition can not be changed as it is performed via the hardware. Its function, anyway, can be combined with a command signal in the sources of the other Blocks. **For example,** with the Drive Enable it is possible to set at zero the Ramp output. In the list of the control signals for the Ramp control Block from the ***Ramp funct src*** source, it is possible to connect to *Ramp input = 0* the Digital Input 0 Enable mon (the Drive enable set on Digital input 0).

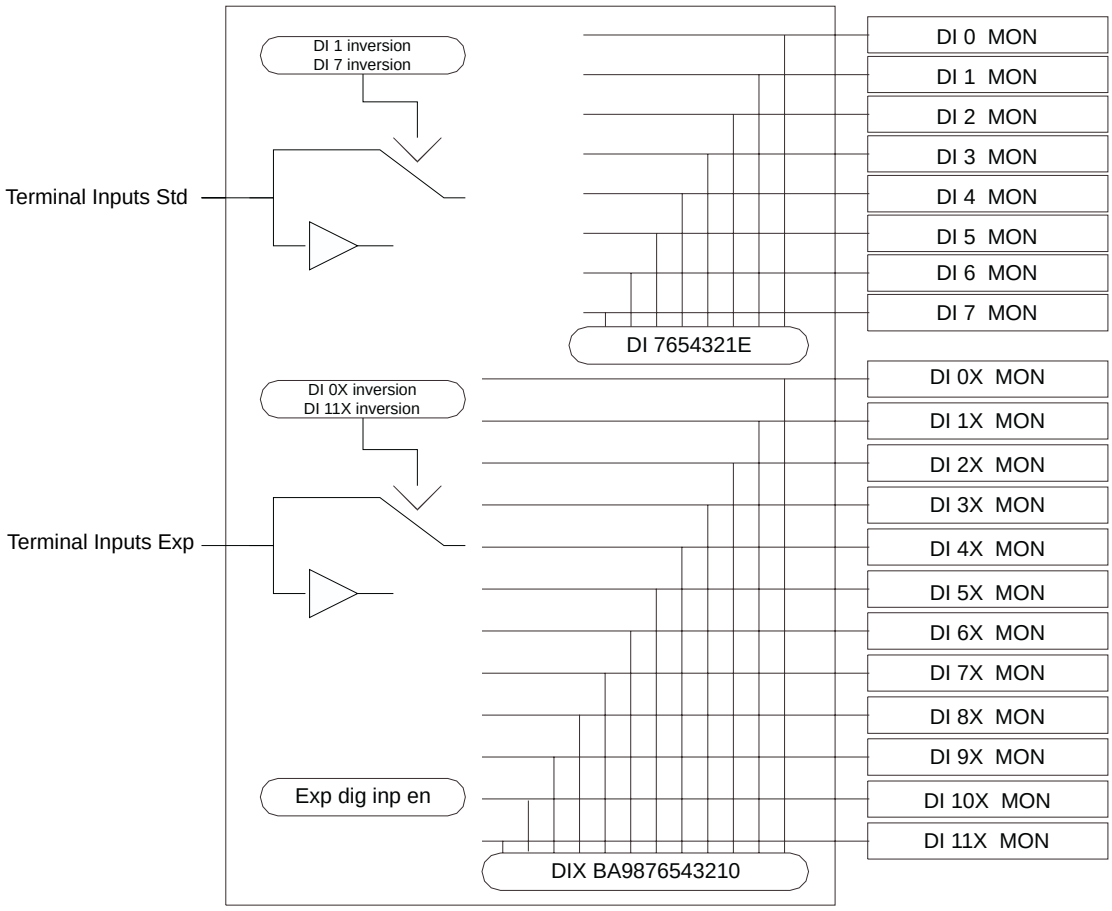
During the Drive enabling phase, therefore, by making the ENABLE active, the Ramp output is set at zero. With the expansion cards it is possible to obtain **12 expanded digital** programmable **inputs,** referred as **Exp** with a "X" suffix.

Description:

```
I/O CONFIG   Digital inputs
             Std digital inps
                 Std dig inp cfg
                     DI 1 inversion
                     DI 2 inversion
                     DI 3 inversion
                     DI 4 inversion
                     DI 5 inversion
                     DI 6 inversion
                     DI 7 inversion
                 Std dig inp mon
                     DI 0 Enable mon
```

```
                    DI 1 monitor
                    DI 2 monitor
                    DI 3 monitor
                    DI 4 monitor
                    DI 5 monitor
                    DI 6 monitor
                    DI 7 monitor
                    DI  7654321E
          Digital inputs
              Exp digital inps
                  Exp dig inp cfg
                    DI  0X inversion
                    DI  1X inversion
                    DI  2X inversion
                    DI  3X inversion
                    DI  4X inversion
                    DI  5X inversion
                    DI  6X inversion
                    DI  7X inversion
                    DI  8X inversion
                    DI  9X inversion
                    DI 10X inversion
                    DI 11X inversion
                  Exp dig inp mon
                    DI  0X monitor
                    DI  1X monitor
                    DI  2X monitor
                    DI  3X monitor
                    DI  4X monitor
                    DI  5X monitor
                    DI  6X monitor
                    DI  7X monitor
                    DI  8X monitor
                    DI  9X monitor
                    DI 10X monitor
                    DI 11X monitor
                    DIX BA9876543210
                  Exp dig inp en
                    Exp dig inp en
I/O CONFIG   SAVE PARAMETERS
```

The Digital Input Block is shown in the figure below.



Std digital inps cfg

DI 1 inversion	It inverts the input signal
.....	.....
DI 7 inversion	It inverts the input signal

Std digital inps mon

DI 0 Enable mon	Monitor for the Enable terminal
DI 1 monitor	Monitor for the Block output 1
.....	.....
DI 7 monitor mon	Monitor for the Block output 7
DI **7654321E**	Monitor for all Inputs. Under each number the logical state of each single Input is displayed.

Exp digital inps cfg

DI 0X inversion	It inverts the input signal
.....	.....
DI 11X inversion	It inverts the input signal

Exp digital inps mon

DI 0X monitor	Monitor for the Block output 0X
.....	.....
DI 11x monitor	Monitor for the Block output 11X
DIX **BA9876543210**	Monitor for all Exp Inputs. Under each number the logical state of each single Input is displayed.

Exp digital inps en

Exp dig inp en	Enabling of the expanded digital inputs

1.6.5 Digital Output Block (Digital Outputs)

The Blocks of the digital outputs allow to turn an internal signal into a signal available on the terminal strip. In this case too there are a series of standard outputs on the drive, referred as **Std,** and a series of outputs available on the expansion cards, referred as **Exp** with a "X" suffix in the numeration sequence. As for the digital inputs, this Block allows **the output inversion.**

The Drive is supplied with **4 standard digital** programmable **outputs** referred as **Std**. With the expansion cards it is possible to obtain **8 expanded digital** programmable **outputs** referred as **Exp** with a "X" suffix.

The Block inputs are:
- Digital output 0 src
- Digital output 1 src
- Digital output 2 src
- Digital output 3 src

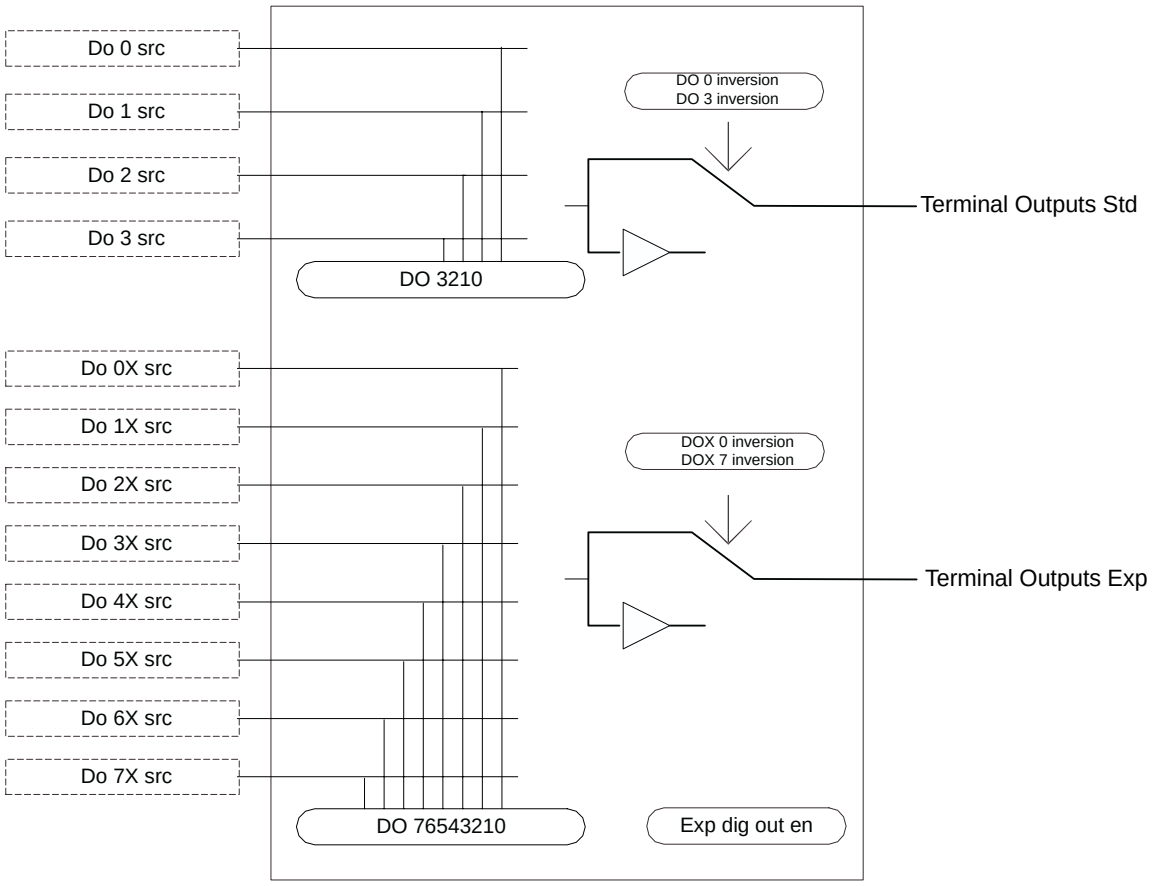
Description:

```
I/O CONFIG   Digital outputs
             Std digital outs
                 Std dig out src
                     DO 0 src
                     DO 1 src
                     DO 2 src
                     DO 3 src
                 Std dig out cfg
                     DO 0 inversion
                     DO 1 inversion
                     DO 2 inversion
                     DO 3 inversion
                 Std dig out mon
                     DO        3210
             Exp digital outs
                 Exp dig out src
                     DO 0X src
                     DO 1X src
                     DO 2X src
                     DO 3X src
                     DO 4X src
                     DO 5X src
                     DO 6X src
                     DO 7X src
                 Exp dig out cfg
                     DO 0X inversion
                     DO 1X inversion
                     DO 2X inversion
                     DO 3X inversion
                     DO 4X inversion
                     DO 5X inversion
                     DO 6X inversion
                     DO 7X inversion
```

Exp dig out mon
DOX 76543210
Exp dig out en
Exp dig out en

I/O CONFIG SAVE PARAMETERS

The Digital Output Block is shown in the figure below.



Std digital outs src

DO 0 src	It connects the selected signal to the output
DO 1 src	It connects the selected signal to the output
DO 2 src	It connects the selected signal to the output
DO 3 src	It connects the selected signal to the output

Std digital outs cfg

DO 0 inversion	It inverts the output signal
.....	.....
DO 3 inversion	It inverts the output signal

Std digital outs mon

DO **3210**	Monitor for all Standard outputs. The output logical state is displayed under each number.

Exp digital out src

DO 0X src	It connects the selected signal to the output
.....	.....
DO 7X src	It connects the selected signal to the output

Exp digital out cfg	
DO 0X inversion	It inverts the output signal
.....	.....
DO 7X inversion	It inverts the output signal
Exp digital out mon	
DO **76543210**	Monitor for all Expanded outputs.
	The output logical state is displayed under each number.
Exp digital outs en	
Exp dig out en	Enabling of the expanded digital outputs

1.6.5.1 Configuration of the OK Relay (Terminals 80, 82)

DO 0 src parameter defines the conditions that the relay contacts will close.

Drive OK The contact closes when the drive is powered up with no failure alarms.

Drive Ready The contact closes when the following conditions are fulfilled:

- The drive is powered up
- There are no failure alarms present
- The drive is enabled. The enable operation is defined by parameters [En/disable mode] & [Commands sel]
- The magnetizing procedure has been completed (Drive is ready to deliver torque).

NOTE! The contact opens immediately on a drive failure, or when the drive is disabled.

1.6.6 Word Composing and Decomposing Block (Bits->Word & Word->Bits)

Sometimes it is necessary to put **some bits** together in order to transfer some information along the communication channel. The Word Composing Block, **Bit->Word**, is useful in this case to communicate, for example, with the DGFC: it is possible to compose a word made of *Drive ready, Drive ok, Ref is zero, Speed is zero*, by communicating on a single word.

The opposite operation is necessary when the digital words written, for example, by the DGFC have to be read. The Word Decomposing Block, **Word->Bit**, allows to set some signals on a digital word; each signal composing the word, on the Block input, can be combined with an output channel.

The **Bits->Wordn** Block has **16 inputs,** where each of them can be connected to a signal; the output of the *Word compn* Block contains the packed input bits.

The **Wordn->Bits** Block has an input word and **16** *Bx Wn decomp* **output bits.**

- **Wordn** and **Wn**, where **n** is **0** or **1**.
- **Bx**, where **x** is a *bit* from **0** to **15**.

Each function has **two** blocks: **Word 0** and **Word 1** – **W0 decomp** and **W1 decomp**.

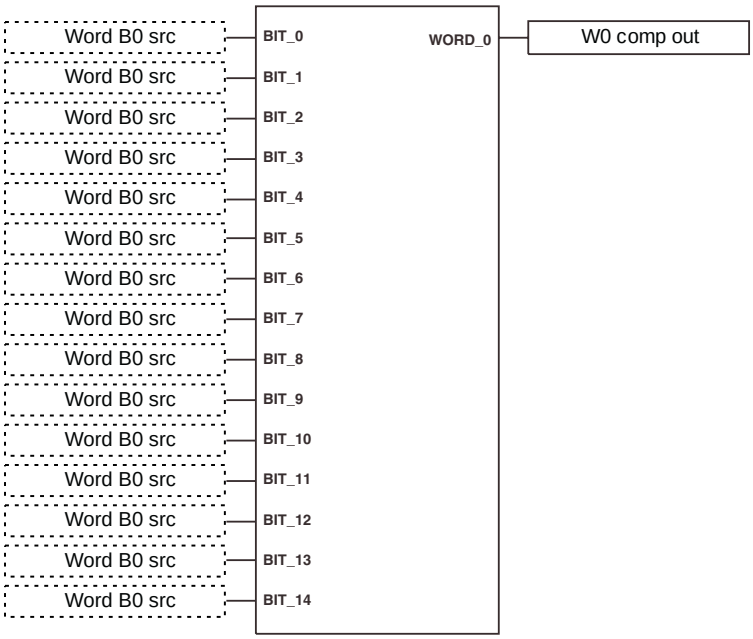
Description:

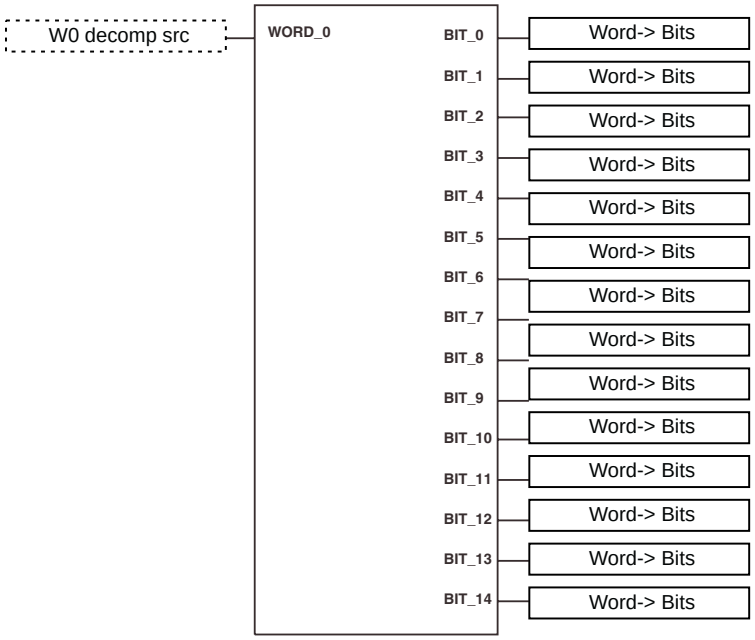
```
I/O CONFIG   Bits->Word
             Bits->Word0 src
                 Word0 B0 src
                 Word0 B1 src
                 Word0 B2 src
                 Word0 B3 src
                 Word0 B4 src
                 Word0 B5 src
                 Word0 B6 src
                 Word0 B7 src
                 Word0 B8 src
                 Word0 B9 src
                 Word0 B10 src
                 Word0 B11 src
                 Word0 B12 src
                 Word0 B13 src
                 Word0 B14 src
                 Word0 B15 src
             Bits->Word0 mon
                 W0 comp out
             Bits->Word1 src
                 Word1 B0 src
                 Word1 B1 src
                 Word1 B2 src
                 Word1 B3 src
                 Word1 B4 src
                 Word1 B5 src
                 Word1 B6 src
                 Word1 B7 src
                 Word1 B8 src
                 Word1 B9 src
                 Word1 B10 src
                 Word1 B11 src
                 Word1 B12 src
                 Word1 B13 src
                 Word1 B14 src
                 Word1 B15 src
             Bits->Word1 mon
                 W1 comp out
I/O CONFIG   Word->Bits
         Word0->Bits src
                 W0 decomp src
             Word0->Bits cfg
                 W0 decomp inp
             Word0->Bits mon
                 W0 decomp mon
                 B0  W0 decomp
```

```
    B1  W0 decomp
    B2  W0 decomp
    B3  W0 decomp
    B4  W0 decomp
    B5  W0 decomp
    B6  W0 decomp
    B7  W0 decomp
    B8  W0 decomp
    B9  W0 decomp
    B10 W0 decomp
    B11 W0 decomp
    B12 W0 decomp
    B13 W0 decomp
    B14 W0 decomp
    B15 W0 decomp
Word1->Bits src
    W1 decomp src
Word1->Bits cfg
    W1 decomp inp
Word1->Bits mon
    W1 decomp mon
    B0  W1 decomp
    B1  W1 decomp
    B2  W1 decomp
    B3  W1 decomp
    B4  W1 decomp
    B5  W1 decomp
    B6  W1 decomp
    B7  W1 decomp
    B8  W1 decomp
    B9  W1 decomp
    B10 W1 decomp
    B11 W1 decomp
    B12 W1 decomp
    B13 W1 decomp
    B14 W1 decomp
    B15 W1 decomp
```

I/O CONFIG SAVE PARAMETERS

The *Bits* - > *Word* / *Word* ->*Bits* Block is shown in the figure below.





Bits->Wordn src

Wordn B0 src	It connects the selected signal to the Block input
.....	.....
Wordn B15 src	It connects the selected signal to the Block input

Bits->Wordn mon

Wn comp out	Monitor for the hexadecimal output value
Wordn->Bits src	
Wn decomp src	It connects the selected signal to the Block input
Wordn->Bits cfg	
Wn decomp inp	It allows to set the *Wn decomp inp* with a value. The *Wn decomp inp* is the default source of the Decomp Word block.
Wordn->Bits mon	
W0 decomp mon	Monitor of the hexadecimal input value for the Decomp Word Block.
B0 Wn decomp	Monitor for each output.
.....	
B15 Wn decomp	

1.6.7 Forward and Reverse Control Block (Fwd Rev Ctrl)

The use of this Block allows a protection in case of a sudden failure of the Forward or Reverse command, therefore a protection on the rotation direction. The Block has two inputs, ***Forward src*** and ***Reverse src,*** and two outputs *FRC invers* and *FRC alarm*.

The output can be connected where necessary, for example on the Ramp or Speed Blocks.

When the drive is started, refer to the following table:

Forward src	Reverse src	FRC invers	FRC alarm
1	1	0	1

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If one of the two input signals is zero, refer to the table below:

Forward src	Reverse src	FRC invers	FRC alarm
0	0	Not change	1
1	0	0	0
0	1	1	0
1	1	Not change	Not change

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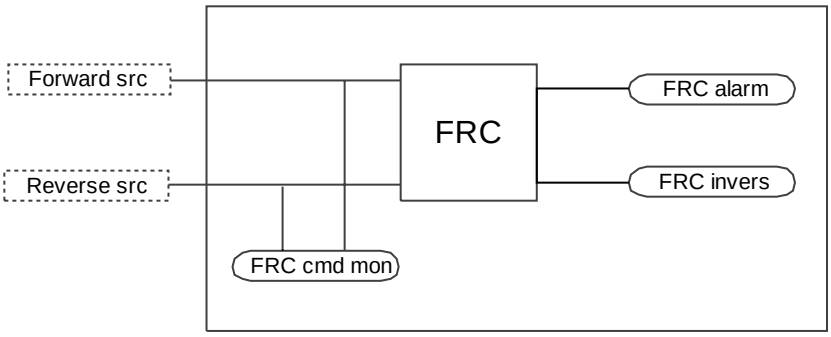
If both inputs are high during the functioning phase, both outputs maintain the previous state.

Description:

```
I/O CONFIG   Fwd Rev Ctrl
             Fwd Rev Ctrl src
                 Forward src
                 Reverse src
             Fwd Rev Ctrl mon
                 FRC cmd mon
                 FRC invers
                 FRC alarm

I/O CONFIG   SAVE PARAMETERS
```

The Forward and Reverse control Block is shown in the figure below.



Fwd Rev Ctrl src

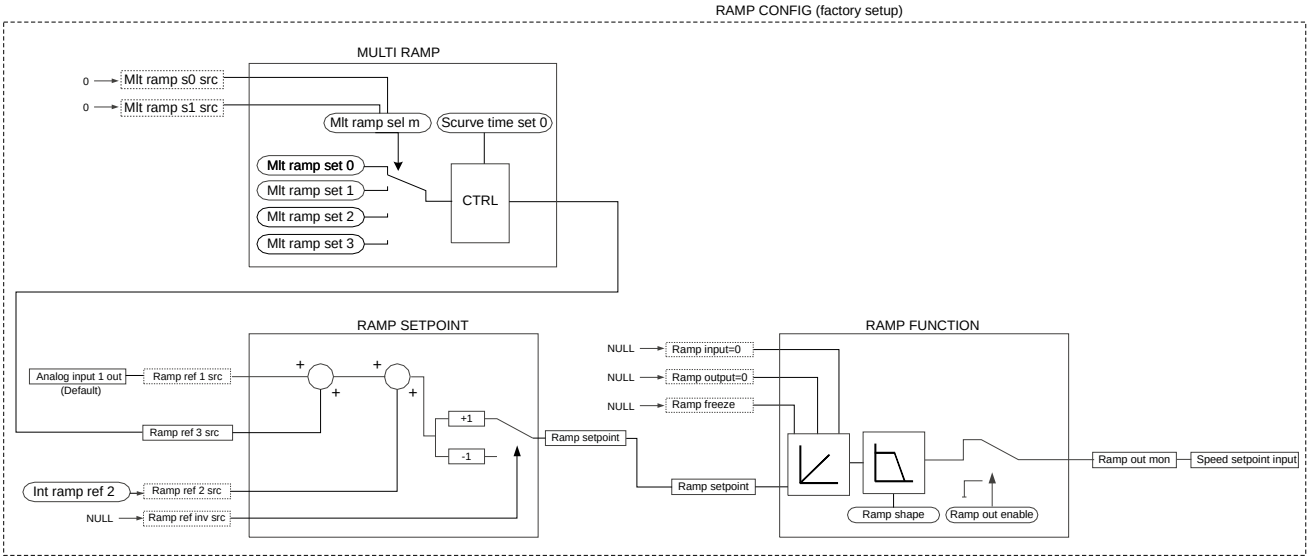
Forward src	It connects the selected signal to Forward
Reverse src	It connects the selected signal to Reverse

Fwd Rev Ctrl mon

FRC cmd mon	Monitor for the Fwd Rev. Fwd LSB, Rev MSB signals.
FRC invers	Monitor for the Invers output
FRC alarm	Monitor for the Alarm output

1.7 RAMP CONFIGURATION (RAMP CONFIG)

It is possible to select a ***Linear*** or ***S- shaped*** ramp.



1.7.1 Ramp Setpoint Block (Ramp Setpoint)

The Function of this Block is to generate the speed Setpoint for the Ramp Block. A Setpoint is a Reference.

By algebraically adding its inputs, the Block generates the output Setpoint.

On the input the Block allows to select the origin of the sources: ***Ramp Ref 1 src*** and ***Ramp Ref 2 src*** are two selectable references.

The internal value can be allocated in the Block configurations through the *Int ramp ref 1* and *Int ram ref 2* parameters.

Ramp Ref 3 src will be added to Ramp Ref 1 src. Default setting is connected to Moto potentiometer output.

Ramp Ref inv src allows to invert the whole output Setpoint. The output state is determined by a multiplier according to the state of the connected signal.

The following references are connected together with the signals of the three input Sources: the output reference of the Motopotentiometer Block and the output reference of the Multi Speed Block.

NOTE! Ramp ref 2 mon must be zero for the drive to stop without opening the enable input.

The inputs of this block are:

- Ramp Ref 1 src
- Ramp Ref 2 src
- Ramp Ref 3 src
- Ramp ref inv src

The outputs are:

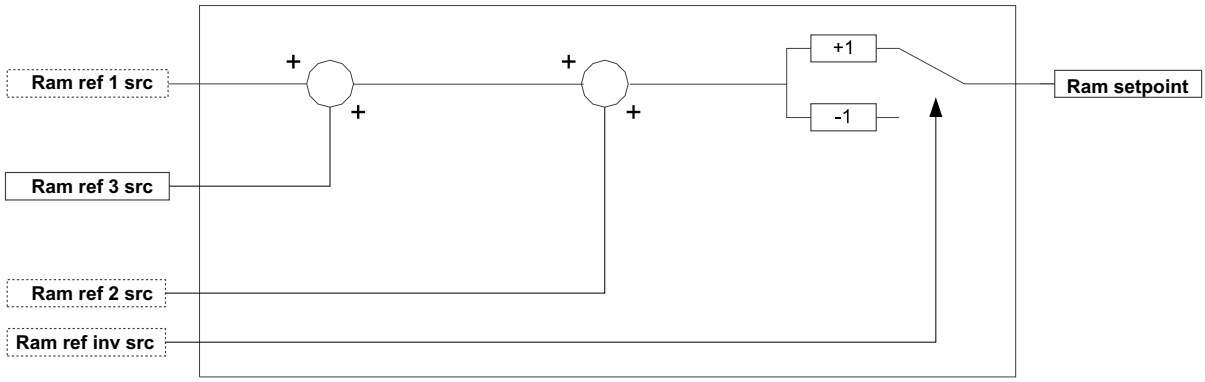
- Ramp setpoint

Some Inputs and the Ramp Setpoint Output signal can be monitored.

Description:

```
RAMP CONFIG  Ramp setpoint
             Ramp ref src
                  Ramp ref 1 src
                  Ramp ref 2 src
                  Ramp ref 3 src
                  Ramp ref inv src
             Ramp ref cfg
                  Int ramp ref 1
                  Int ramp ref 2
                  Int ramp ref 3
             Ramp ref mon
                  Ramp ref 1 mon
                  Ramp ref 2 mon
                  Ramp ref 3 mon
                  Ramp setpoint
RAMP CONFIG  SAVE PARAMETERS
```

The **Ramp Setpoint Block** is shown in the figure below.



Ramp ref src

Ramp ref 1 src	It connects the selected signal as Ramp Ref 1
Ramp ref 2 src	It connects the selected signal as Ramp Ref 2
Ramp ref 3 src	It connects the selected signal as Ramp Ref 3
Ramp ref inv src	It connects the selected signal to the selector of the multiplier input: if the signal is 0, multiply by +1, or if the signal is 1, multiply by -1.

Ramp ref cfg

Int ramp ref 1	Setting of the Int ramp ref 1 variable
Int ramp ref 2	Setting of the Int ramp ref 2 variable
Int ramp ref 3	Setting of the Int ramp ref 3 variable

Ramp ref mon

Ramp ref 1 mon	Monitor of the Ramp ref 1 signal
Ramp ref 2 mon	Monitor of the Ramp ref 2 signal
Ramp ref 3 mon	Monitor of the Ramp ref 3 signal
Ramp setpoint	Monitor of the Ramp setpoint output signal

1.7.2 Multi Ramp Block (Multi Ramp)

This Block allows to select **4 different sets** of the Ramp times. Each Ramp time set allows to set the acceleration and deceleration times of the *Ramp and* of the *S-Ramp* and the deceleration time of the *Fast Stop.*

The Block has two input sources: ***Multi Ramp set 0 src*** and ***Multi ramp set 1 src***.

According to the state of the signals connected to the sources, it is possible to **select** one of the output **Multi Ramp Sets.**

These are called: **MRO** – **MR1** – **MR2** – **MR3**.

The state of each single **Set** is monitored via the *Multi Ramp sel mon* menu, where if **MR0** is active, the value displayed is **0**, if **MR1** is active, the value displayed is **1**, etc.

The next table lists the possible combinations of the inputs, which, on their turn, determine the different outputs:

Multi Ramp set 1 src	Multi Ramp set 0 src	ACTIVE SET
0	0	MR0
0	1	MR1
1	0	MR2
1	1	MR3

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The normally used Ramp is the one set in Set 0.

The inputs of this Block are: · Mlt ramp s0 src
· Mlt ramp s1 src

The outputs are: · The **ACTIVE SET** which goes into the Ramp Block

Each set is made of (for example MR0):

- MR0 acc dlt spd **Delta speed acceleration** – speed variation in rpm
- MR0 acc dlt time **Delta time acceleration** - time, in seconds, needed to perform the acc dtl sdp
- MR0 dec dlt spd **Delta speed deceleration** – speed variation in rpm
- MR0 dec dlt time **Delta time deceleration** - time, in seconds, needed to perform the dec dtl spd
- MR0 fdec dlt spd **Faststop-Delta speed deceleration** – for the faststop ramp, as for dec dtl spd
- MR0 fdec dlt time **Faststop-Delta time deceleration** – for the faststop ramp, as for dec dtl time
- MR0 acc S curve **acceleration** half-adjust time for the **S-Ramp** in seconds
- MR0 dec S curve **deceleration** half-adjust time for the **S-Ramp** in seconds

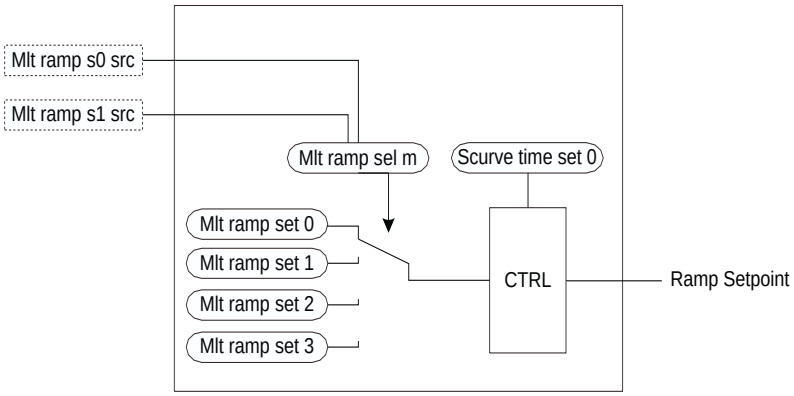
Description:

```
RAMP CONFIG Multi ramp
            Multi ramp src
                 Mlt ramp s0 src
                 Mlt ramp s1 src
            Multi ramp cfg
                 Multi ramp set 0
                      Acc set 0
                           MR0 acc dlt spd
                           MR0 acc dlt time
                      Dec set 0
                           MR0 dec dlt spd
```

MR0 dec dlt time
Dec FS set 0
MR0 fdec dlt spd
MR0 fdec dlttime
Scurve time set0
MR0 acc S curve
MR0 dec S curve
Multi ramp set 1
Acc set 1
MR1 acc dlt spd
MR1 acc dlt time
Dec set 1
MR1 dec dlt spd
MR1 dec dlt time
Dec FS set 1
MR1 fdec dlt spd
MR1 fdec dlttime
Scurve time set1
MR1 acc S curve
MR1 dec S curve
Multi ramp set 2
Acc set 2
MR2 acc dlt spd
MR2 acc dlt time
Dec set 2
MR2 dec dlt spd
MR2 dec dlt time
Dec FS set 2
MR2 fdec dlt spd
MR2 fdec dlttime
Scurve time set2
MR2 acc S curve
MR2 dec S curve
Multi ramp set 3
Acc set 3
MR3 acc dlt spd
MR3 acc dlt time
Dec set 3
MR3 dec dlt spd
MR3 dec dlt time
Dec FS set 3
MR3 fdec dlt spd
MR3 fdec dlttime
Scurve time set3
MR3 acc S curve
MR3 dec S curve
Multi ramp mon
Mlt ramp sel mon

RAMP CONFIG SAVE PARAMETERS

The Multi Ramp Block is shown in the figure below.



Multi ramp src

Mlt ramp s0 src	0 selector source of the Ramp Set
Mlt ramp s1 src	1 selector source of the Ramp Set

Multi ramp set 0

RAMP Acc set 0
MR0 acc dlt spd
MR0 acc dlt time
RAMP Dec set 0
MR0 dec dlt spd
MR0 dec dlt time
RAMP Dec FS set 0
MR0 fdec dlt spd
MR0 fdec dlttime
RAMP Scurve time set0
MR0 acc S curve
MR0 dec S curve

Multi ramp mon

Mlt ramp sel mon	Monitor of the selected ramp set

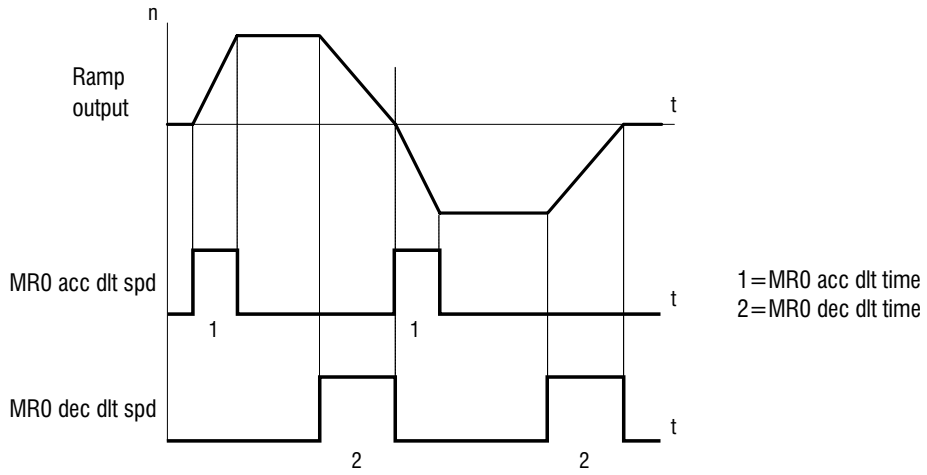


Figure 1.7.2.1: Acceleration and Deceleration Ramps

1.7.3 Ramp Block (Ramp Function)

The Function of this Block is to generate the **Ramped Speed** reference. Such signal is generated by tracking the reference of the Ramp Setpoint Block with the Ramp times defined in the Multi Ramp Block.

The Block allows to select the source origin on the input:

Ramp input = 0 which allows to obtain the input zero setting, ***Ramp output = 0*** which allows to obtain the output zero setting, ***Ramp freeze*** which maintains on the output the reference value independently of the possible variations on the input.

Furthermore, among the parameters it is possible to configure:

with *Ramp shape* the ramp type, if a Linear or an S-shaped, with *Ramp out enable* it is possible to disable the Ramp output only as a reference, that is blocking the output by keeping the signal active.

When the Drive is enabled, the Block has at its disposal the **Catch on the fly** function, capturing a rotating motor. The function allows to detect the motor speed and to set the output of the Ramp Block at the same speed as the motor one.

The main application fields are: the reinsertion after an alarm intervention or during the capturing of a motor already started by a load, etc.

It is possible to monitor the output signal, the output state (if enabled or disabled), the ramp acceleration or deceleration state and the command state.

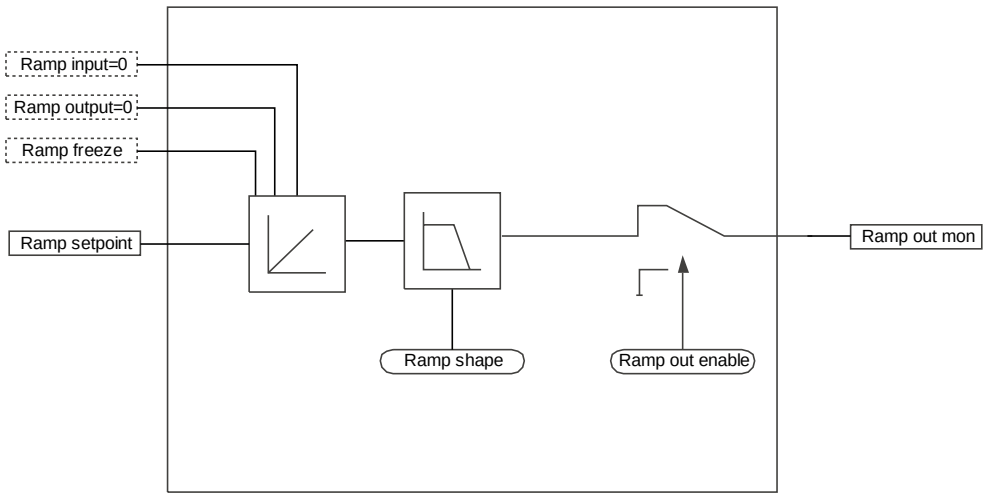
The inputs of this Block are:
- Ramp input=0
- Ramp output=0
- Ramp freeze

The outputs are:
- Ramp out mon
- Ramp acc state
- Ramp dec state
- Ramp out != 0

Description:

```
RAMP CONFIG  Ramp function
             Ramp funct src
                  Ramp input=0
                  Ramp output=0
                  Ramp freeze
             Ramp funct cfg
                  Ramp out enable
                  Ramp shape
             Ramp funct mon
                  Ramp out mon
                  Ramp acc state
                  Ramp dec state
                  Ramp out != 0
                  Ramp cmds mon
RAMP CONFIG  SAVE PARAMETERS
```

The **Ramp Block** is shown in the figure below.



Ramp function

RAMP CONFIG Ramp funct src	
Ramp input=0	Selection of the source Ramp imput=0
Ramp output=0	Selection of the source Ramp output=0
Ramp freeze	Selection of the source Ramp freeze=0
Ramp funct cfg	
Ramp out enable	Ramp enabling
Ramp shape	Ramp selection. Linear or S-shaped ramp
Ramp funct mon	
Ramp out mon	Ramp output monitor
Ramp acc state	Ramp state. 1 = Acceleration
Ramp dec state	Ramp state. 1 = Deceleration
Ramp out != 0	Ramp output different from zero. If enable = 0. If disable = 1
Ramp cmds mon	Command monitor for the ramp Block Bit 0 -> Ramp output = 0, if ONE the value is 1 Bit 1 -> Ramp input = 0, if ONE the value is 2 Bit 2 -> Ramp freeze, if ONE the value is 4 Bit 3 -> Ramp out enable

NOTE! the acceleration/deceleration state makes reference to a speed increase/decrease with an absolute value.

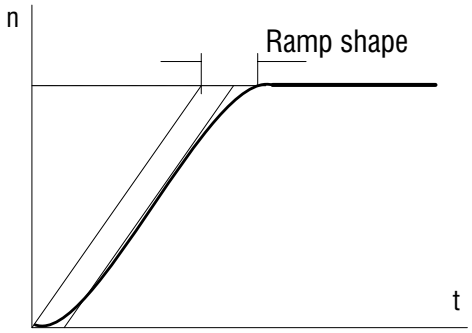


Figure 1.7.3.1: Ramp Shape

1.8 SPEED CONFIGURATIONS (SPEED CONFIG)

1.8.1 Speed Setpoint Block and Speed Ratio Block (Speed Setpoint & Speed Ratio)

The Function of the **speed Setpoint block** is to generate the Setpoint for the speed regulation Block. The speed Setpoint is obtained by algebraically adding on the input the references *Speed ref 1* and *Speed ref 2*, the Ramp Block output *Ramp output* and the Jog Block output, *Jog output.* A Setpoint is a Reference.

On the input the Block allows to connect the following sources:

Speed ref 1 src and ***Speed ref 2 src*** allow to select the origin of the speed references. In a standard condition such sources are connected to *Int speed ref 1* and *Int speed ref 2*, which can be set in the Block configurations.

Speed ref inv src allows to invert the whole output Setpoint. A multiplier determines the output state according to the state of the connected signal.

NOTE! Ramp ref 2 mon must be zero for the drive to stop without opening the enable input.

The **Speed Ratio** function is implemented on the Block. With such function, given a line reference on several Drives, it is possible to regulate the percentage (%) of the local speed reference as compared to the line.

The Function adds to its inputs the Ramp Block output, *Ramp output*, with the *Speed ref 1* reference. The sum is multiplied by the Speed ratio. The resulting value is referred as **Speed Draw** (in rpm).

Speed ratio src allows to select the origin of the signals stating the speed ratio, for example the *Int speed ratio* with a % value is standard connected and can be configured in the Ratio Block.

In the Block configurations, furthermore, together with the already mentioned references, it is also possible to configure the *Speed top* and the *Speed bottom*. They state the speed upper and lower limit. Their value is given in **rpm**.

On the output it is possible to monitor some input signals and the Block outputs: the Speed setpoint reference, the Speed draw output and the Speed limit state, which determines the reaching of the set speed limit.

The inputs of this Block are:
- Speed Ref 1 src
- Speed Ref 2 src
- Speed ref inv src
- Speed ratio src
- Ramp out mon
- Jog output

The outputs:
- Speed setpoint
- Speed draw out
- Speed lim state

The Function of the **Speed Ratio Block** allows to set the Speed Ratio.

The Block source, ***Speed ratio src***, is the same as the one present in the Speed Setpoint Block.

int speed ratio with a % value is standard connected, but, anyway, also the connection of analog and digital signals is possible.

The ***Speed ratio cfg*** configuration menu allows to configure the *Int speed ratio* parameter.

Its default value is **100%**, corresponding to the multiplicative factor **1**.

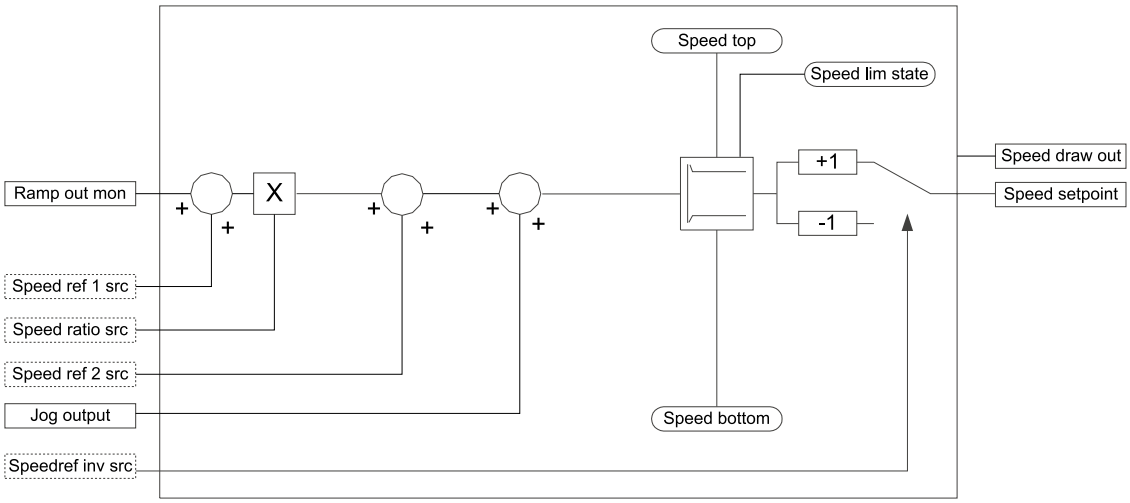
The Block input:
- Speed ratio src

The output: · Speed ratio mon

Description:

```
SPEED CONFIG Speed setpoint
                Speed ref src
                    Speed ref 1 src
                    Speed ref 2 src
                    Speed ratio src
                    Speedref inv src
                Speed ref cfg
                    Int speed ref 1
                    Int speed ref 2
                    Speed top
                    Speed bottom
                Speed ref mon
                    Ramp out mon
                    Speed ref 1 mon
                    Speed ref 2 mon
                    Jog output
                    Speed draw out
                    Speed lim state
                    Speed setpoint
SPEED CONFIG Speed ratio
                Speed ratio src
                    Speed ratio src
                Speed ratio cfg
                    Int speed ratio
                Speed ratio mon
                    Speed ratio mon
SPEED CONFIG SAVE PARAMETERS
```

The Speed Setpoint and **Speed Ratio Block** is shown in the figure below.



Speed ref src

Speed setpoint	
Speed ref 1 src	Selection of the source of the speed reference 1
Speed ref 2 src	Selection of the source of the speed reference 2
Speed ratio src	Selection of the source of speed ratio
Speedref inv src	It connects the selected signal to the selector of the multiplier input: if the signal is 0, multiply by +1, or if the signal is 1, multiply by -1.

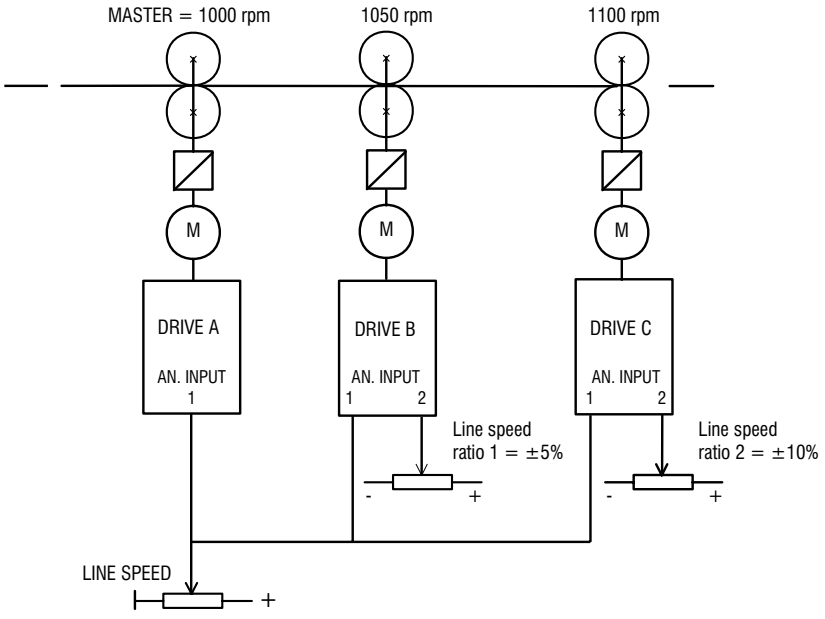
Speed ref cfg

Int speed ref 1	Setting of the Int speed ref 1 variable
Int speed ref 2	Setting of the Int speed ref 2 variable
Speed top	Speed upper limit (in rpm)
Speed bottom	Speed lower limit (in rpm)

Speed ref mon

Ramp out mon	Monitor for the output of the Ramp Block
Speed ref 1 mon	Speed ref 1 Monitor
Speed ref 2 mon	Speed ref 2 Monitor
Jog output	Monitor for the output of the Jog Block
Speed draw out	Monitor for the Speed draw output
Speed lim state	Monitor for the speed Limit state. 1 active limit
Speed setpoint	Speed setpoint Monitor
Speed ratio src	Source selection
Speed ratio cfg	Setting of the speed ratio with a % value
Speed ratio mon	Monitor for the speed ratio value

1.8.1.1 Example: Rubber Calender



Example setting:

DRIVE A (master)

Set: **Ramp ref 1 src = An inp 1 output**

DRIVE B

Line speed ratio 1 = Line speed +/- 5%

Set: **Ramp ref 1 src = An inp 1 output**

Set: **Speed ratio src = An inp 2 output**

Set in submenù Analog input 2 config: **An inp 2 type = +/-10V**

An inp 2 lo lim = **15564 count**

An inp 2 hi lim = 17203 count

DRIVE C

Line speed ratio 2 = Line speed +/- 10%

Set: **Ramp ref 1 src = An inp 1 output**

Set: **Speed ratio src = An inp 2 output**

Set in submenù Analog input 2 config: **An inp 2 type = +/-10V**

An inp 2 lo lim = **14745 count**

An inp 2 hi lim = 18072 count

For count parameters of **lo lim** e **hi lim** to see capter 1.1.3 Signal Normalization, or to use:

100% : 16384 = 105% : X hi lim for Line speed +5%

100% : 16384 = 95% : X lo lim for Line speed -5%

1.8.2 Speed Regulation Block (Spd reg Function)

The Block Function, **Regulator of the PI Speed** (Proportional Integrative), is only active in a **Sensorless and Field Oriented** mode.

Among its functions the Block is set to work together with the Speed/Torque regulation Block (OR regulator). Through the input sources it is possible to select the origin of the input signals:

Spd I=0 src allows to set at zero, temporary, the Regulator Integral section, while ***Spd PI=0 src*** allows to set at zero, temporary, the Regulator ProportionalIntegral section.

In the configurations it is possible to enable or disable the Block function (*enable/disable*) via the *Spd reg enable* parameter.

The gains set in the Adaptive Block of the Speed Regulator gains are active in the Speed Regulator itself.

They are set in the REGULATION PARAM / spd regulator menu where it is possible to set the basic gain of the P and I sections and their respective % gains.

The inputs of this Block are:

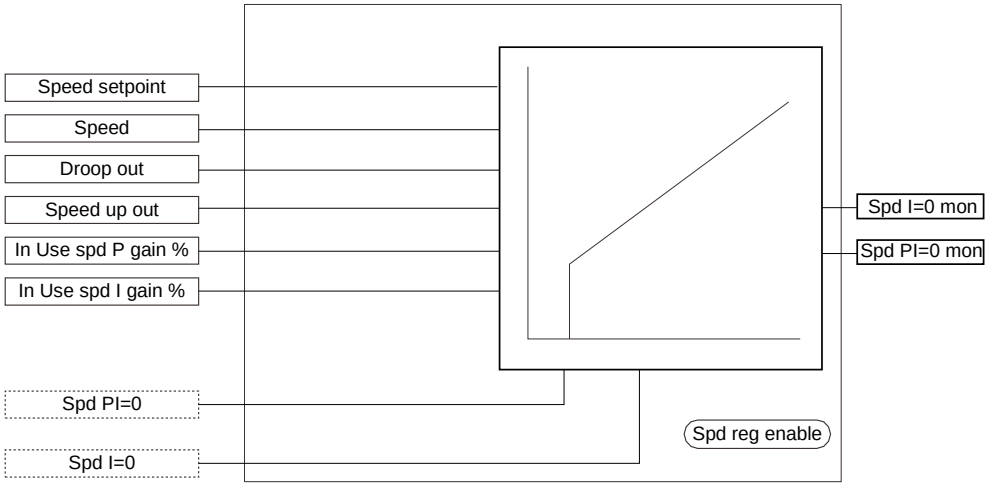
· Speed ref Out
· Speed feedback
· Speed PI = 0 src
· Speed I = 0 src
· P gain
· I gain

Description:

```
SPEED CONFIG Spd reg function
             Spd reg func src
                  Spd  I=0
                  Spd PI=0
             Spd reg func cfg
                  Spd reg enable
             Spd reg func mon
                  Spd  I=0 mon
                  Spd PI=0 mon
SPEED CONFIG SAVE PARAMETERS

REGULATION PARAM Spd regulator
             Percent values
                  SpdP1 gain
                  SpdI1 gain
             Base values
                  SpdP base value
                  SpdP base value
             In use values
                  InUse SpdP gain%
                  InUse SpdI gain%
REGULATION PARAM SAVE PARAMETERS
```

The Speed Regulation Block is shown in the figure below.



SPEED CONFIG

Spd reg func src

`Spd  I=0` Selection of the Source of the Integral section Block. The integral section is set at zero and stops its integrating activity.

`Spd PI=0` Selection of the source of the Integral and Proportional section Block. The integral section is set at zero and stops its integrating activity.

Spd reg func cfg	
Spd reg enable	Enabling of the speed regulator
Spd reg func mon	
Spd I=0 mon	State monitor for the command Spd I=0
Spd PI=0 mon	State monitor for the command Spd PI=0
REGULATION PARAM	
Spd regulator	
Percent values	
SpdP1 gain	Gain of the Proportional section as a percentage of the basic value
SpdI1 gain	Gain of the Integral section as a percentage of the basic value
Base values	
SpdP base value	Basic value of the Proportional gain
SpdP base value	Basic value of the Integral gain
In use values	
InUse SpdP gain%	Value in use for the Proportional gain. It allows to know the active gain if the gain profile curve has been set.
InUse SpdI gain%	Value in use for the integral gain.

1.8.3 Jog Function Block (Jog)

This Block states the Speed reference of the Jog Function.

It is possible to set **4** Jog speeds: *Jog 0*, *Jog 1*, *Jog 2* and *Jog 3*. The output desired speed can be activated according to the state of the selection inputs ***Jog sel 0 src*** and ***Jog sel 1 src***. On the Block input it is possible to select via ***Jog invers src*** a signal which, through an internal multiplier, is able to state the output inversion (Jog output).

Furthermore with ***Jog 0 src*** it is possible to select the reference signal of Jog 0 (Jog 0 standard configuration); with ***Jog cmd src*** it is possible to select the command for the activation of the Jog Block (NULL standard configuration).

In the Block configurations, together with the setting of the 4 different speeds, it is possible to state the ramp times (acceleration and deceleration) of the Jog Function. The table below lists the possible combinations of the inputs stating the active reference:

Jog sel 1 src	Jog sel 0 src	ACTIVE JOG
0	0	Jog 0
0	1	Jog 1
1	0	Jog 2
1	1	Jog 3

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The usually active Speed is that of JOG 0.

Through *Jog sel mon* it is possible to monitor which speed is active on the output. The Jog 0 reference value, the Block state and the Block output (in rpm) can be monitored too.

The Block inputs are:

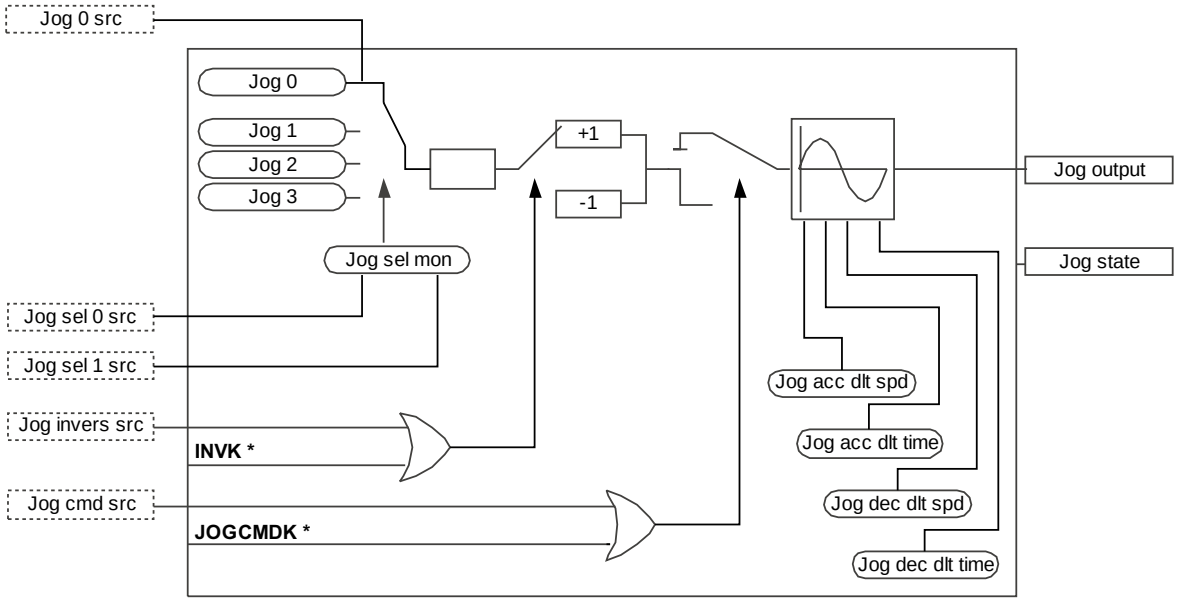
- Jog 0 src
- Jog cmd src
- Jog sel 0 src
- Jog sel 1 src
- Jog invers src

The outputs: · Jog output
· Jog sel mon
· Jog 0 mon
· Jog state

Description:

```
SPEED CONFIG Jog
                Jog src
                    Jog 0 src
                    Jog cmd src
                    Jog sel 0 src
                    Jog sel 1 src
                    Jog invers src
                Jog cfg
                    Jog 0
                    Jog 1
                    Jog 2
                    Jog 3
                    Jog acc dlt spd
                    Jog acc dlt time
                    Jog dec dlt spd
                    Jog dec dlt time
                Jog mon
                    Jog 0 mon
                    Jog sel mon
                    Jog output
                    Jog state
SPEED CONFIG SAVE PARAMETERS
```

The Jog Block is shown in the figure below (* Keypad command).



Jog src	
Jog 0 src	Reference source for Jog 0
Jog cmd src	Source for the Jog Block activation command
Jog sel 0 src	Bit 0 source for the selection of the active Jog reference
Jog sel 1 src	Bit 1 source for the selection of the active Jog reference
Jog invers src	Source for the Jog reference inversion command
Jog cfg	
Jog 0	Jog 0 speed
Jog 1	Jog 1 speed
Jog 2	Jog 2 speed
Jog 3	Jog 3 speed
Jog acc dlt spd	Delta speed acceleration for the Jog ramp
Jog acc dlt time	Delta time acceleration for the Jog ramp
Jog dec dlt spd	Delta speed deceleration for the Jog ramp
Jog dec dlt time	Delta time deceleration for the Jog ramp
Jog mon	
Jog 0 mon	Monitor for the Jog 0 reference value
Jog sel mon	Monitor for the active Jog speed
Jog output	Jog Block output
Jog state	Jog Block state

1.8.4 Multi Speed Block (Multi Speed)

This Block allows to set up to **8** Internal Speed references, one of which is supplied with the Speed 0 Reference function. **Three** selection inputs allow to activate on the output the desired Speed.

Through the ***Mtl spd s 0 src***, ***Mtl spd s 1 src***, ***Mtl spd s 2*** sources, it is possible to select the origin of the signals stating the input combination (they are standard connected to NULL).

The ***Mtl spd 0 src*** source states the origin of the Speed 0 Reference signal (it is standard connected to *Mtl spd 0*). The **8** chosen speeds can be set in the configurations via *Mtl spd 0 – 7*. The following table lists the possible combinations of the three inputs stating the active Speed (0-7):

Mtl spd sel 2 src	Mtl spd sel 1 src	Mtl spd sel 0 src	ACTIVE SPEED
0	0	0	Multi speed 0
0	0	1	Multi speed 1
0	1	0	Multi speed 2
0	1	1	Multi speed 3
1	0	0	Multi speed 4
1	0	1	Multi speed 5
1	1	0	Multi speed 6
1	1	1	Multi speed 7

TAV3i011

Speed 0 is usually active

It is possible to monitor the Block output, the state of the Speed 0 Reference and the output active Speed.

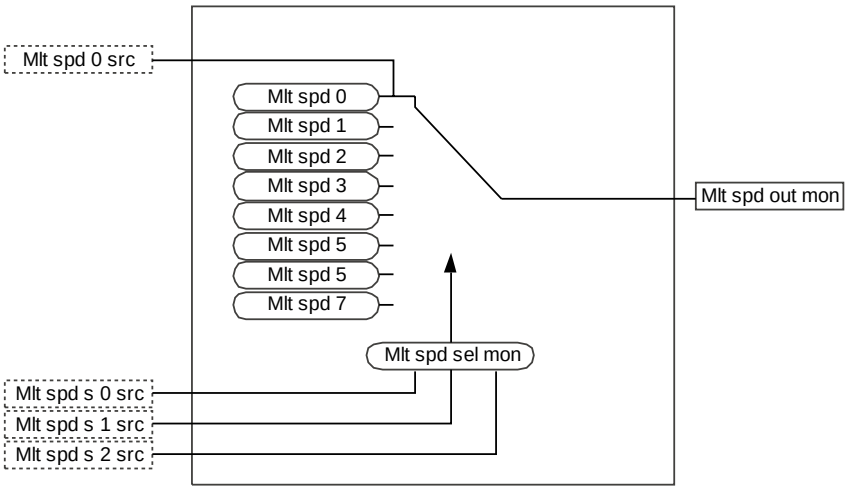
The Block inputs are:
- Mtl spd 0 src
- Mtl spd s 0 src *(Mtl spd s 0 = Multi speed s(elector) 0)*
- Mtl spd s 1 src
- Mtl spd s 2 src

The outputs:
- Mtl spd 0 mon
- Mtl spd sel mon
- Mtl spd out mon

Description:

```
SPEED CONFIG Multi speed
                Multi speed src
                    Mlt spd 0 src
                    Mlt spd s 0 src
                    Mlt spd s 1 src
                    Mlt spd s 2 src
                Multi speed cfg
                    Mlt spd 0
                    Mlt spd 1
                    Mlt spd 2
                    Mlt spd 3
                    Mlt spd 4
                    Mlt spd 5
                    Mlt spd 6
                    Mlt spd 7
                Multi speed mon
                    Mlt spd 0 mon
                    Mlt spd sel mon
                    Mlt spd out mon
SPEED CONFIG SAVE PARAMETERS
```

The Multi Speed Block is shown in the figure below.



Multi speed src	
Mlt spd 0 src	Mlt spd 0 source reference
Mlt spd s 0 src	Bit 0 source for the selection of the active Multi spd reference
Mlt spd s 1 src	Bit 1 source for the selection of the active Multi spd reference
Mlt spd s 2 src	Bit 2 source for the selection of the active Multi spd reference
Multi speed cfg	
Mlt spd 0	Speed 0
Mlt spd 1	Speed 1
Mlt spd 2	Speed 2
Mlt spd 3	Speed 3
Mlt spd 4	Speed 4
Mlt spd 5	Speed 5
Mlt spd 6	Speed 6
Mlt spd 7	Speed 7
Multi speed mon	
Mlt spd 0 mon	Speed 0 monitor
Mlt spd sel mon	Active selection monitor
Mlt spd out mon	Monitor for the multispeed Block output

1.8.5 Motopotentiometer Block (Moto Pot)

The Motopotentiometer Function is **always active.**

Furthermore, through the ***Motopot up src*** and ***Motopot down src*** sources it is possible to select the origin of the Speed increase and decrease and of the command signals.

The Block offers also the possibility to invert the output reference. The ***Motopot invers src*** source selects the inversion command.

The Speed Preset source, ***Motopot preset src***, allows to select the Preset command. Such function can activate a series of settings active on the input and/or output reference.

In the Block configurations it is possible to set, with *Motopot lower lim* and *Motopot upper lim*, the speed upper and lower limit (in rpm and standard configured with 0 and 1000).

The Motopotentiometer acceleration and deceleration ramps are independent from those of the Ramp Block.

This Block, therefore, with *Motopot acc dtl spd/time* and *Motopot dec dtl spd/time*, allows to set the Motopotentiometer Ramp.

Motopot init config allows to set the function stating the Motopotentiometer reference value when the Drive is started. This parameter is selected among:

- Power off — value at the turning off
- Zero — zero rpm
- Lower limit — Lower limit value
- Upper limit — Upper limit value

Furthermore, *Motopot preset cfg* states the function of the Preset command. It is possible to select:

- None — no operation
- Input = 0 — the input state is set at zero
- Input = low lim — it sets on the input the speed lower limit
- Input & ref = 0 — it sets at zero the input and reference state

- Input & ref = low lim — it sets on the input and on the reference the speed lower limit
- Output = 0 — it sets at zero the output state
- Output = low lim — it sets on the output the speed lower limit
- Output & ref = 0 — it sets at zero the output and reference state
- Output & ref = low lim — it sets on the output and on the reference the speed lower limit
- Input = upp lim — it sets on the input the speed upper limit
- Input & ref = upp — it sets on the input and on the reference the speed upper limit
- Freeze input — it freezes the input reference independently of the following variations

On the output it is possible to monitor the output and command state.

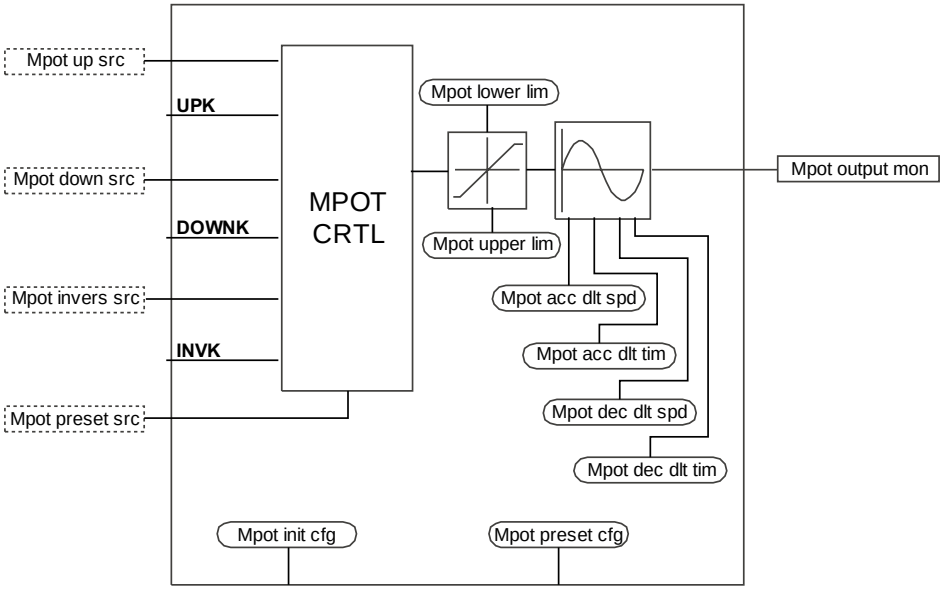
The Block inputs are:
- Motopot up src
- Motopot down src
- Motopot invers src
- Motopot preset src

The outputs:
- Motopot cmd mon
- Motopot output mon

Description:

```
SPEED CONFIG Moto pot
                Moto pot src
                    Mpot up src
                    Mpot down src
                    Mpot invers src
                    Mpot preset src
                Moto pot cfg
                    Mpot lower lim
                    Mpot upper lim
                    Mpot acc dlt spd
                    Mpot acc dlt tim
                    Mpot dec dlt spd
                    Mpot dec dlt tim
                    Mpot init cfg
                    Mpot preset cfg
                Moto pot mon
                    Mpot cmd mon
                    Mpot output mon
SPEED CONFIG SAVE PARAMETERS
```

The Motopotentiometer Block is shown in the figure below.



Moto pot src	
Mpot up src	Source of the up command, speed increase
Mpot down src	Source of the down command, speed decrease
Mpot invers src	Source of the command inverting the output speed
Mpot preset src	Source of the preset command
Moto pot cfg	
Mpot lower lim	Upper limit
Mpot upper lim	Lower limit
Mpot acc dlt spd	Delta speed acceleration for the Motopot ramp
Mpot acc dlt tim	Delta time acceleration for the Motopot ramp
Mpot dec dlt spd	Delta speed deceleration for the Motopot ramp
Mpot dec dlt tim	Delta time deceleration for the Motopot ramp
Mpot init cfg	Configuration of the Init command
Mpot preset cfg	Configuration of the Preset command
Moto pot mon	
Mpot cmd mon	Command monitor
Mpot output mon	Block output monitor

1.8.6 Speed Zero Control Block (Spd 0 Logic)

The Function of the Speed 0 Block is **active** only in a **Sensorless** and **Field oriented** mode.

The Function generates the Speed 0 signal, **Spd is zero**, and the Reference 0 signal, **Ref is zero**.

In the configurations it is possible to set: with *Spd 0 speed thr and Spd 0 spd delay* the Speed 0 **threshold** and **delay**; with *Spd 0 ref thr and Spd 0 ref delay* the **threshold** and the **delay** of the reference 0. Furthermore with *Spd 0 enable* it is possible to enable the gain adaptive function with a Speed 0 value and with *Spd 0 P gain* and *Spd 0 I gain* to adapt the **P**roportional and **I**ntegral gain to a Speed 0 value.

The gains become active when both conditions Spd is zero *and* Ref is zero are true. They are not active when Ref is zero is false.

The **Speed 0** signal, Speed is zero, **becomes active** when **the motor speed is lower** than the *Spd 0 speed thr* **threshold**. The signal "Spd is zero delay" is delayed by *Spd 0 spd delay.*

The **Reference 0** signal, Ref is zero, **becomes active** when **the speed reference** connected to ***Spd 0 ref src*** is lower than the *Spd 0 ref thr* threshold. The signal "Ref is zero delay" is delayed by *Spd 0 ref delay.*

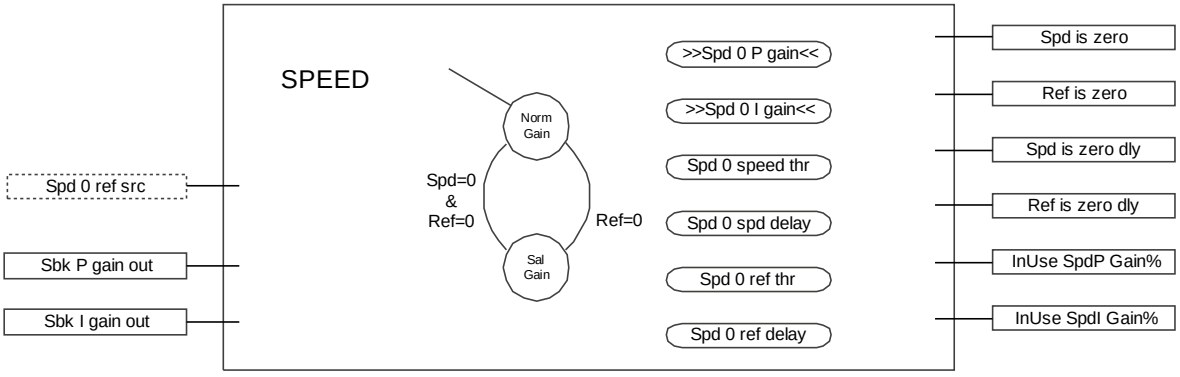
On the ***Spd 0 ref src*** source it is possible to select the following signals:

- Null — zero
- Ramp ref — Ramp Block reference
- Speed ref — Speed Block reference
- Int spd 0 ref — internal value (it can be set in the configurations)

Description:

```
SPEED CONFIG     Spd 0 logic
             Spd 0 logic src
                      Spd 0 ref src
                 Spd 0 logic cfg
                      Spd 0 enable
                      Int spd 0 ref
                      Spd 0  P gain
                      Spd 0  I gain
                      Spd 0 speed thr
                  Spd 0 spd delay
                      Spd 0 ref thr
                      Spd 0 ref delay
                 Spd 0 logic mon
                  Spd is zero
                      Ref is zero
                      Spd is zero dly
                  Ref is zero dly
                      InUse SpdP gain%
                      InUse SpdI gain%
SPEED CONFIG SAVE PARAMETERS
```

The Speed 0 Block is shown in the figure below.



Spd 0 logic src	
Spd 0 ref src	Reference selection to determine ref= 0. It can be selected among Ramp, Speed, Null, Int spd 0 ref
Spd 0 logic cfg	
Spd 0 enable	Adaptive enable with a speed 0
Int spd 0 ref	Internal spd ref variable
Spd 0 P gain	P gain with a speed 0
Spd 0 I gain	I gain with a speed 0
Spd 0 speed thr	Speed 0 threshold
Spd 0 spd delay	Delay on the speed 0
Spd 0 ref thr	Threshold on the Reference 0
Spd 0 ref delay	Delay on the Reference 0
Spd 0 logic mon	
Spd is zero	Speed 0 state
Ref is zero	Reference 0 state
Spd is zero dly	Delayed speed 0 state
Ref is zero dly	Delayed reference 0 state
InUse SpdP gain%	Gains in use
InUse SpdI gain%	Gains in use

1.8.7 Speed Regulator Gain Profile Block (Speed Gain Profile)

The Block function is active only in a Sensorless and Field Oriented mode.

The Speed Gain Profile function, SGP, allows different gains of the speed Regulator according to the variations in the speed value or another user defined signal (ex. load variations, diameter, PID output, etc).

The Block adapts the gains of the speed regulator according to the signal connected to the ***SGP ref src*** source (standard connected to *Int SGP ref*, Block internal value in count) and to the Profile of the set gains.

The Profile of the set gain is stated by:

- three levels of speed Proportional and Integral gain, ***SpdPx gain %*** and ***Spd Ix gain %***.
- two *thresholds* (threshold - thr), ***SPG tran21 h thr*** and ***SPG tran32 l thr***, which define the point of the transitions between the three gain levels (see the figure)
- two transition Bands, ***SGP tran21 band*** and ***SGP tran32 ban***d, that define the slope, by straight lines, connecting the gain levels.

Refer to the Speed Gain Profile block diagram. It is possible to set the value of the internal reference, *Int SGP ref*, and its specific basic value, *SGP base value*.

SPG function is defaulted for use with Ramp reference, Speed reference or Norm speed. These variable's scalings are 16384 counts, corresponding to the drive parameter [Full scale speed]. This is the reason why ***SGP base value*** parameter is defaulted to 16384 counts.

SGP base value parameter can also be changed if gain modification is driven by some variable that has full scale different then 16384 counts. For example 4096 counts, that comes from bus or other variables present in the system. It is also possible to write an independent variable value to ***Int SGP ref*** parameter.

NOTES!

The selection of base value must be done prior to assigning thresholds and bands. After any change of SPG base value, gains must be reassigned.

Values assigned to thresholds and bands must be in ascending order.

The value assigned to parameter [***SGP tran21 h thr***] must be higher then parameter [***SGP tran 32 I thr***] . Bands must be narrower then half the distance between [***SGP tran21 h thr***] and [***SGP tran 32 I thr***].

When the motor is stopped, the gain of the Speed Regulator is set by the ***Speed 0 P gain*** and ***Speed 0 I gain***, if the speed 0 function is enabled.

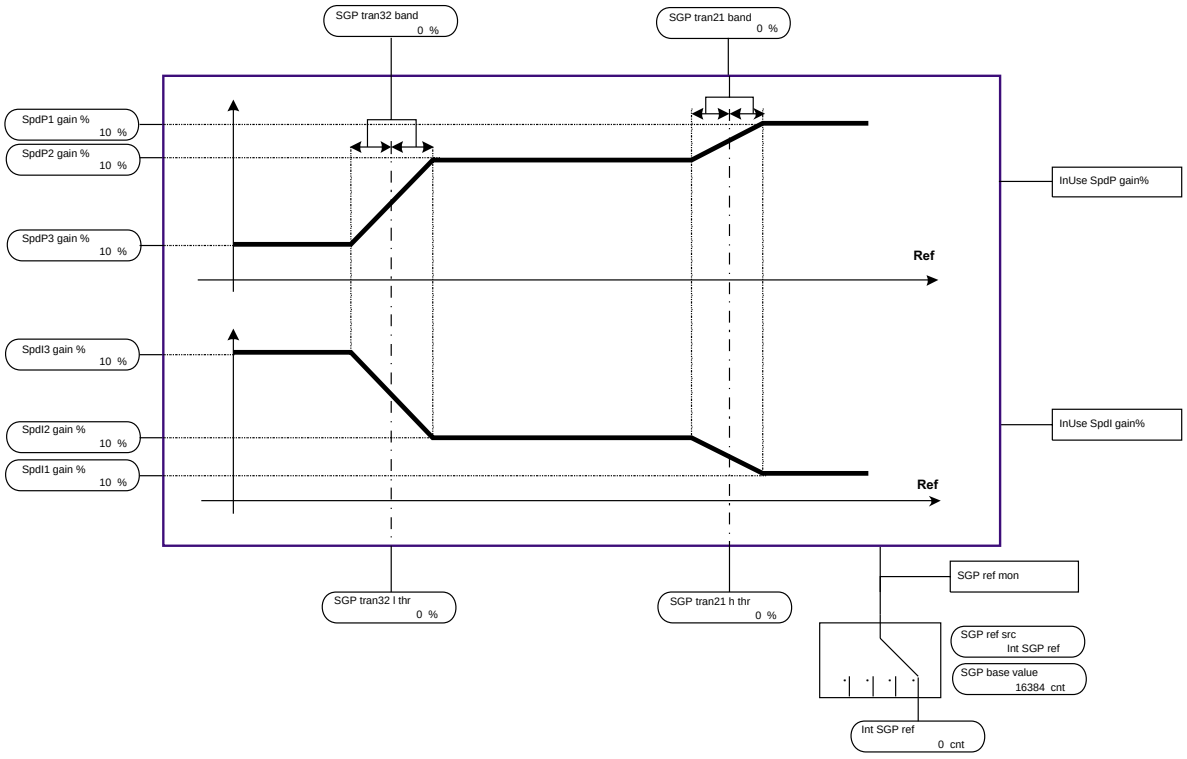
The Block input is:
· SGP ref src

The outputs are:
· SGP ref mon
· In use SpeedP gain%
· In use SpeedI gain%

Description:

```
SPEED CONFIG Spd gain profile
             SGP src
                 SGP ref src
             SGP cfg
                 SpdP1 gain %
                 SpdI1 gain %
                 SpdP2 gain %
                 SpdI2 gain %
                 SpdP3 gain %
                 SpdI3 gain %
                 SGP tran21 h thr
                 SGP tran32 l thr
                 SGP tran21 band
                 SGP tran32 band
                 Int SGP ref
                 SGP base value
             SGP mon
                 SGP ref mon
                 InUse SpdP gain%
                 InUse SpdI gain%
SPEED CONFIG SAVE PARAMETERS
```

The Gain Adaptive Block is shown in the figure below.



Spd gain profile src

SGP ref src	Source selection of the adaptive x axis	
Spd gain profile cfg		
SpdP1 gain %	Proportional Gain	1° segment
SpdI1 gain %	Integral Gain	1° segment
SpdP2 gain %	Proportional Gain	2° segment
SpdI2 gain %	Integral Gain	2°segment
SpdP3 gain %	Proportional Gain	3° segment
SpdI3 gain %	Integral Gain	3° segment
SGP tran21 h thr	Segment transition point from 1 to 2	
SGP tran32 l thr	Segment transition point from 2 to 3	
SGP tran21 band	Width of the transition band from 1 to 2	
SGP tran32 band	Width of the transition band from 2 to 3	
Int SGP ref	SGP internal reference	
SGP base value	Basic value corresponding to 100% of the SGP Reference	
Spd gain profile mon		
SGP ref mon	SGP Reference Monitor	
InUse SpdP gain%	Value of the proportional gain in use	
InUse SpdI gain%	Value of the integral gain in use	

1.8.8 Droop Block "Current scale" (Speed Droop)

The Function of the Droop Block is **active** only in a **Sensorless** and **Field oriented** mode.The Block is made of:

- a comparison node between the torque reference (generated by the speed regulator or with trq 2?) and the Droop Comp variable
- a proportional regulator whose output is (added or subtracted) to the overall speed reference. This is supplied with a low passing filter and a limit on the correction to be provided

It is used, for example, with the coupling of two motors. The advantage of using the Droop Block is the possibility to let the speed regulators enabled on both Drives. The correction on the Drive reference, when the Droop Block is enabled, avoids the loop saturation. In case a load loss occurs on one of the two motors, the speed is controlled with a difference as compared to the reference of Droop limit al +.

This function is used to realize a current scale. It is typically used when two motors are mechanically combined one with the other (ex. they are connected on the same shaft). They both must rotate at the same speed. If one of the two motors tends to rotate at a higher speed, the consequence is a difference typical for the control Drives and an overload condition. The second motor acts as a brake.

Such a condition causes an unbalance between the two currents, which can be eliminated via the Droop Function. By adding a correction term to the Drive speed reference (proportional to the load difference), the two currents on the motors are balanced again.

The ***Droop enable src*** source states the origin of the signal enabling the Droop function.

Droop comp src allows the connection of the Droop reference signal (standard connected to the *Droop comp* internal reference).

In the Block configurations it is possible to set: with *Droop gain* the function gain, with *Droop filter* the time constant of the input filter, with *Droop limit* the allowed reference correction limit and with *Droop comp* the value of the internal reference.

It is possible to monitor the Block output, Droop out (in rpm).

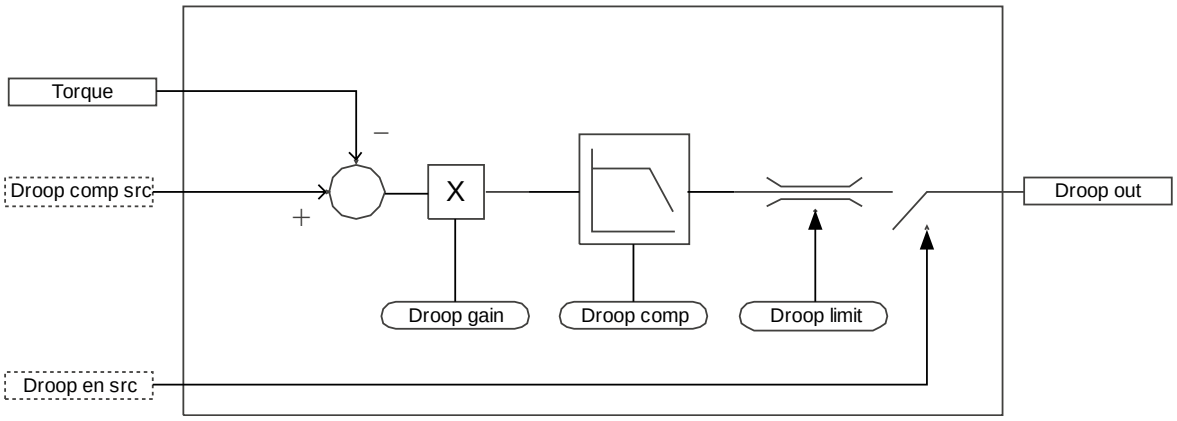
The Block inputs are: · Droop enable src
· Droop comp src

The outputs: · Droop output

Description:

```
SPEED CONFIG    Speed droop
                Speed droop src
                    Droop en src
                    Droop comp src
                Speed droop cfg
                    Droop gain
                    Droop filter
                    Droop limit
                    Droop comp
                Speed droop mon
                    Droop out
SPEED CONFIG SAVE PARAMETERS
```

The Droop Block is shown in the figure below.



Speed droop src	
Droop en src	Source of the function enabling
Droop comp src	Droop reference function
Speed droop cfg	
Droop gain	Function gain
Droop filter	Filter time constant
Droop limit	Allowed correction limit
Droop comp	Internal value of the Droop reference
Speed droop mon	
Droop out	Block output correction

1.8.9 Speed Feedback Derivative Block "Speed Up" (Spd Fbk Deriv)

The Function is **active** only in a **Sensorless** and **Field oriented** mode.

The Block Function, Spd fbk derivative, is used to avoid oscillations or provide forcing in case of loads with a high moment of inertia. It is made of a Derivative component in the feedback circuit, which is in a position to limit the "Overshoot".

The function can be used in case of cyclical non-constant loads applied on the motor (ex. cams).

The Derivative component applied to the speed regulator Block is made of two components:

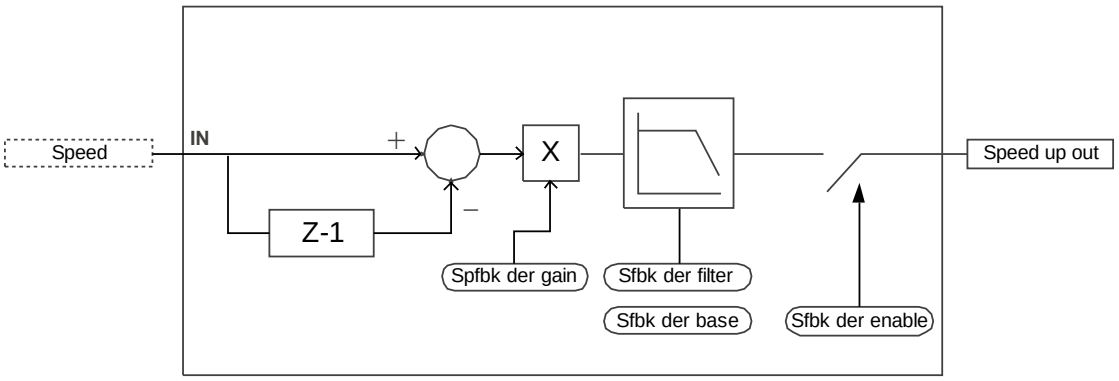
- motor speed
- output signal of the Speed up function

In the Block configurations it is possible with *Sfbk der enable* to enable or disable the function, with *Sfbk der gain* to set the % gain of the function, with *Sfbk der base* to set the basic % gain and with *Sfbk der filter* to set the time constant of the derivative component.

Description:

```
SPEED CONFIG Spd fbk deriv
             Sfbk deriv cfg
                  Sfbk der enable
                  Spfbk der gain
                  Sfbk der base
                  Sfbk der filter
SPEED CONFIG SAVE PARAMETERS
```

The Speed feedback derivative Block is shown in the figure below.



Speed fbk deriv cfg

Sfbk der enable	Function enabling (enable or disable)
Spfbk der gain	% Gain value
Sfbk der base	Basic value of the % gain
Sfbk der filter	Time constant of the Derivative component

1.8.10 Inertia and Friction Compensation Block (Inertia / Frict cp)

The Function is active only in a **Sensorless** and **Field oriented** mode.

The Block Function is to compensate the Inertia and the Frictions caused by the loads during the motor acceleration or deceleration phase.

The function, by calculating the acceleration on the reference, is in a position to supply a **Torque FeedForward**.

Such condition allows a better regulation in the presence of loads with a high inertia.

The parameter calculation is performed during the self-tuning procedure of the speed loop.

As an alternative, the user can set the parameters by hands.

The source, ***I/F cp en src*** allows to select the origin of the to enable or disable the function. ***Inertia src*** allows to select the origin of the command signal **moment of inertia**; default this is connected to *Int Inertia* (stare value) that it possible to set in the configurations.

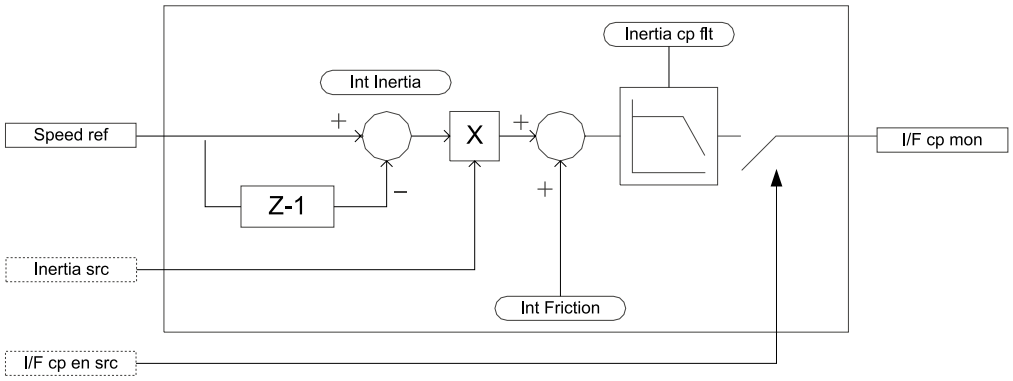
Morever in the Block configurations it is possible with *Int Friction* to set the friction value and with *Inertia cp flt* to state the time constant of the filter on the compensation.

The Block input is: · I/F cp en src
· Inertia src

Description:

```
SPEED CONFIG Inertia/Frict cp
                I/F cp en src
                    I/F cp en src
                    Inertia src
                I/F cp cfg
                    Int Inertia
                    Int Friction
                    Inertia cp flt
                I/F cp mon
                    I/F cp mon
SPEED CONFIG SAVE PARAMETERS
```

The Inertia and Friction compensation Block is shown in the figure below.



Inertia/Frict cp src

I/F cp en src	Value source to enable or disable the funtion
Inertia src	Value source of the moment of inertia

Inertia/Frict cp cfg

Int Inertia	Internal value of the moment of Inertia
Int Friction	Friction internal value
Inertia cp flt	Filter on the compensation

Inertia/Frict cp mon

I/F cp mon	Monitor of output

1.9 TORQUE CURRENT CONFIGURATIONS (TORQUE CONFIG)

1.9.1 Block Generating the Torque Setpoint, the Torque Current Limit Control and the Zero Torque. (Torque Setpoint - Torque Curr Lim - Zero Torque Cmd)

The Block generates the Torque Current Setpoint.

The inputs are:

· the output of the Speed regulator if it is enabled

· the additional Torque setpoint

· the Current limit, which is also controlled, by Drive, the Motor and BU I2t function

· Flux, for flux compensation of the Torque current

NOTE! to see Torque control Block figure

The Block add the output of the Speed regulator and the additional Torque reference 2.

With SpeedTorque control Mode function, SpdTrq ctrl mode, it possible to select the behaviour of the reference Torque reference 1 + Torque reference 3 control over Torque current reference limit.

The **Torque ref 1** + Torque ref 3 behavior: · OFF
· Limiting the requested Torque
· SpeedTorque mode

The SpdTrq mode src source selects the origin signal for the SpeedTorque control Mode function. This source is default connected to Int SpdTrq mode. It that can be set in the following configurations:

OFF, Symmetrical lim, Positive lim, Negative lim, Positive SpeedTorque, Negative SpeedTorque

· OFF (0) Disabled

Symmetrical lim, Positive lim, Negative lim

The speed regulator is saturated by the Speed reference selections. Using Torque ref 1 and/or Torque ref 3 it is possible to regulate the output torque from the maximum to zero. In case of slippage or material break, the speed will increase up to reach the speed reference, or until the net torque ref is below needed load current. It is possible to select Torque ref 1 + Torque ref 3 to act:

· Symmetrical lim (1) On positive and negative limits symmetrically (Torque ref sum must be positive; if it's negative the value is clamped to zero)

· Positive lim (2) Torque ref only modifies the Positive limit (Torque ref sum must be positive; if it's negative the value is clamped to zero)

· Negative lim (3) Torque ref only modifies the negative limit (Torque ref sum must be negative; if it's positive the value is clamped to zero)

Positive SpeedTorque, Negative SpeedTorque

In this case the torque requested by the Speed regulator is compared with the sum of Torque ref 1 + Torque ref 3. If the Net Torque ref is lower in respect to the Speed regulator command, the Torque ref wins and it is given as reference to the Current regulator (Iq Current). Otherwise the Speed regulator command will produce the reference for the current regulator. It is possible to select Torque ref 1 + Torque ref 3 to act:

· Positive SpdTrq (4) Saturating the speed regulator output positive, the sum [Torque ref 1 + Torque ref 3] can be positive or negative. The sum [Torque ref 1 + Torque ref 3] will be Torque ref unless the Speed regulator output is more negative than the sum [Torque ref 1 +Torque ref 3].

If sum [Torque ref 1 + Torque ref 3] is negative, while the Speed regulator output is positive, an external control may be needed to keep from motor overspeed in the negative direction, during a material break or slippage.

· Negative SpdTrq (5) Saturating the speed regulator output negative, the sum [Torque ref 1 + Torque ref 3] can be positive or negative. The sum [Torque ref 1 + Torque ref 3] will be Torque ref unless the Speed regulator output is more positive than the sum [Torque ref 1 +Torque ref 3]. If sum [Torque ref 1 + Torque ref 3] is positive, while the Speed regulator output is negative, an external control may be needed to keep from motor overspeed in the positive direction, during a material break or slippage.

NOTE! It is possible to assign Torque ref 3 src to Inertia compensation. This allows a user to inertia conpensate a torque regulator internally. Using ***SpdTrq mode src*** from another variable other than *Int Spdtrq mode* requires the variable to write an integer value to select the mode. The corresponding integer is shown in parenthesis.

The ***Torque ref 3 src*** source allow to select the origin of the Torque ref 3 signal, which is adds with Torque ref 1. This source is standard connected to *Int torque ref 3* [Nm] that can be set in the configurations.

The ***Torque ref 1 src*** source allow to select the origin reference **signal to control the Current limit** (Torque ref 1). This source is standard connected to *Int torque ref 1* [Nm] that can be set in the configurations.

The ***Torque ref 2 src*** source allow to select the origin of the Torque reference 2 signal.

This source is standard connected to *Int torque ref 2* [Nm] that can be set in the configurations.

NOTE! During operation it's necessary to disable the Speed reguator output.

It is possible to set the Filter **time constant** on the Speed regulator proportional part, via *Prop filter* parameter.

Current Torque limit control

After Torque control, the Torque Current Limit can modify Torque current reference.

Through the *Tcurr lim sel* parameter it is possible to select, into a list, the limit to be controlled:

`off`	none
`T lim +/-`	positive or negative limit
`T lim mot/gen`	generator motor limit
`T lim gen power`	limit on the generated power
`T lim Vdc ctrl`	limit on the DC link voltage control

Furthermore, via the *Tcurr lim +* and *Tcurr lim –* parameters it is possible to set the positive and negative current limit value.

Zero Torque control

The Block **controls** the Zero Torque sets the sum of Speed regulator output + Torque reference to zero. (Torque reference is refered to Torque ref 1, Torque ref 2 and Torque ref 3).

The origin of the zero Torque command signal can be selected via the ***Zero trq cmd src*** source. The parameters and the sources included into >>Torque<< are available only with a **Sensorless** and **Field Oriented** mode.

Description:

TORQUE CONFIG **Torque setpoint**

T setpoint src

>>Torque ref 1 src**<<**

>>Torque ref 2 src**<<**

>>Torque ref 3 src<<

>>SpdTrq mode src <<

T setpoint cfg

>>Int torque ref 1**<<**

>>Int torque ref 2**<<**

>>Int torque ref 3<<

>>Prop filter **<<**

>>Int SpdTrq mode **<<**

T setpoint mon

>>Torque ref 1 mon**<<**

>>Torque ref 2 mon**<<**

>>Torque ref 3 mon<<

>>Torque ref **<<**

>>SpdTrq ctrl stat**<<**

>>SpdTrq mode mon <<

TORQUE CONFIG **Torque curr lim**

Trq curr lim cfg

Tcurr lim sel

Tcurr lim +

Tcurr lim –

Trq curr lim mon

Inuse Tcurr lim+

Inuse Tcurr lim-

Tcurr lim state

TORQUE CONFIG **Zero torque cmd**

Zero trq cmd src

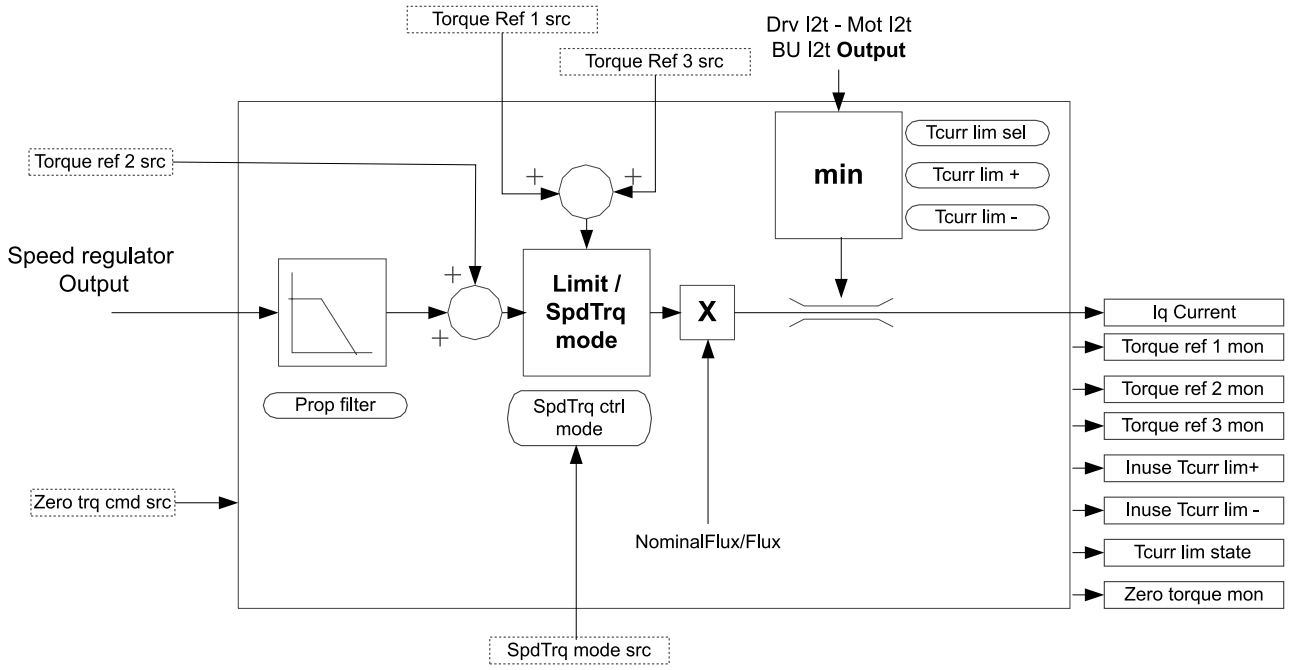
>>Zero trq cmd src**<<**

Zero trq cmd mon

>>Zero torque mon**<<**

TORQUE CONFIG **SAVE PARAMETERS**

The Torque Setpoint Block **is shown in the figure below.**



Torque setpoint src

>> Torque ref 1 src	**<<**	Torque reference 1 source
>> Torque ref 2 src	**<<**	Torque reference 2 source
>> Torque ref 3 src	<<	Torque reference 3 source
>> SpdTrq mode src	<<	SpeedTorque select mode source

Torque setpoint cfg

>> Int torque ref 1	**<<**	Torque ref 1 internal value
>> Int torque ref 2	**<<**	Torque ref 2 internal value
>> Int torque ref 3	<<	Torque ref 3 internal value
>> Prop filter	<<	Filter on the torque reference
>> Int SpdTrq mode	<<	Select if the limitation of the delivered torque is active and in which way.

Torque setpoint mon

>> Torque ref 1 mon	**<<**	Torque ref 1 variable monitor
>> Torque ref 2 mon	**<<**	Torque ref 2 variable monitor
>> Torque ref 3 mon	<<	Torque ref 3 variable monitor
>> Torque ref	<<	Overall Torque ref variable monitor
>> SpdTrq ctrl stat	<<	SpdTrq control state monitor
>> SpdTrq mode mon	<<	SpdTrq mod monitor

Torque curr lim cfg

Tcurr lim sel	Selection of the Current limit type
Tcurr lim +	Positive current limit or Motor
Tcurr lim -	Negative current limit or Generator

Torque curr lim mon

Inuse Tcurr lim+	Monitor for the positive current limit in use
Inuse Tcurr lim-	Monitor for the negative current limit in use
Tcurr lim state	Reached, not reached current limit state

Zero torque cmd src

>> Zero trq cmd src	**<<**	Zero torque command source

Zero torque cmd mon

>> Zero torque mon	**<<**	Zero torque command monitor

1.9.2 DC Link Voltage Control (VdcCtrl Reg - Max Regen Power)

The Function is available only with a Sensorless and Field Oriented regulation mode. The Block allows the control:

· of the DC link voltage during regenerating (ex. deceleration), to avoid the Overvoltage alarm trip.

or

· the control of the power recovered on the DC link during regenerating.

The two functions are activated by setting the following parameters respectively in the Trq curr lim cfg / Tcrr lim sel of the Torque Setpoint Block:

T lim Vdc ctrl for a control of the DC link voltage

T lim gen power for a control of the recovered power

During such phases the *VdcCtrl P gain* and *VdcCtrl I gain* parameters (gains) allow the tuning, if required, of the DC link control.

Description:

```
TORQUE CONFIG    VdcCtrl reg
                     >> VdcCtrl P gain     <<
                     >> VdcCtrl I gain     <<
                 Max regen power
                     >> Max regen power    <<
TORQUE CONFIG    SAVE PARAMETERS
```

`VdcCtrl P gain` Proportional gain

`VdcCtrl I gain` Integral gain

`Max regen power` Regenerating power limit. It is valid in case the *Tlim Gen Power mode* is active.

1.10 FLUX CURRENT CONFIGURATIONS (FLUX CONFIG)

1.10.1 Control of the Flux Current Maximum Limit (Flux Max Limit)

This Function allows the user to control the maximum value of the Flux current. The function is linked to the control of the voltage loop. In a condition where the Flux is = 0, the voltage regulator prevails by controlling the motor. It means that it is only possible to further limit the requirement of the voltage loop.

In case the Drive is active in the constant torque area, it is possible to set an overflux up to 115% of the rated flux. This is possible, obviously, only if the motor/drive combination is in a position to supply a sufficient magnetizing current.

The ***Flux max lim src*** source allows to select the function control signal. In the standard configuration the source is connected to *Int flx maxlim*, a parameter which can be set in **cfg**.

NOTE! The Function is **active** only in a **Sensorless** and **Field oriented** mode.

The input is: · Flux max lim src

Description:

```
FLUX CONFIG      Flux max limit
                      Flux max lim src
                           Flux max lim src
                      Flux max lim cfg
                           Int flx maxlim
                      Flux max lim mon
                            In use flx max lim
FLUX CONFIG      SAVE PARAMETERS
```

`Flux max lim src`	Selection of the Flux max lim source
`Int flx maxlim`	Internal value of Flux max limit
`In use flx max lim`	Flux limit value in use

1.10.2 Control of the Magnetizing Current (Magnetiz Config)

The Function is **active** only in a **Sensorless** and **Field oriented** mode and is useful for undesidered motor shaft rotation. It allows to **lock** the Flux position, **Lock flux**, and to set a Ramp time of the magnetizing current **Magn ramp time**.

In the configurations it is possible to start the Lock flux function. Via the *Lock flux pos* parameter, it is possible to lock the flux position when the following selected condition is satisfied:

· `Off`	non-active function
· `At magnetization`	to the magnetizing current
· `At Spd=0`	with a Speed 0
· `At magn & Spd=0`	to the magnetizing current and with a Speed 0
· `At magn and Ref=0`	magnetizing current and Ref 0

NOTE! In order to use the **Catch on Fly** function, it is necessary to set Lock Flux pos = Off.

Furthermore, in *Magn ramp time* it is possible to set the magnetizing current ramp time in seconds, which can be used:

- To slow down the temporary magnetizing period and avoid a rotation of the motor shaft due to the stator-rotor alignment.
- To speed up the magnetizing phase.

Description:

```
FLUX CONFIG      Magnetiz config
                      Magn ramp time
                      Lock flux pos
FLUX CONFIG      SAVE PARAMETERS
```

`Magn ramp time`	Ramp time of the magnetizing current
`Lock flux pos`	It states if and when the flux position lock has to be enabled.

1.10.3 Output Voltage Control (Output Vlt Ref)

The Function allows the **regulation of the flux in the constant power area** where a voltage margin must be available for the regulation. This value is usually equal to 2% of the maximum output voltage.

A higher value allows a faster response of the voltage regulator but with a lower amount of available voltage on the output. A lower value allows a higher output voltage with a decrease of the dynamic performances.

The ***Outvlt lim src*** source allows to select the function control signal.

In the standard configuration the source is connected to *Int Outvlt lim*, internal value.

Via the *Int Outvlt lim* parameter, which can be set in the configurations, it is also possible to control the maximum value of the output voltage and to state, therefore, the starting voltage of the discharge point (380V standard).

This value can not be higher than the one stated by *Available Outvlt*.

The available voltage margin is stated via the *Dyn vlt margin* parameter, which can be set in the configurations.

As for the normalized value see paragraph 1.1.3 Normalizations Signal.

NOTE! The Function is **active** only in a **Sensorless** and **Field oriented** mode.

Description:

```
FLUX CONFIG      Output vlt ref
                      Out vlt ref src
                           Outvlt lim src
                      Out vlt ref cfg
                           Dyn vlt margin
                           Int Outvlt lim
                      Out vlt ref mon
                           Available Outvlt
                           In use Outvlt ref
FLUX CONFIG      SAVE PARAMETERS
```

Output vlt ref src

Outvlt lim src	Signal selection of the Output volt lim source

Output vlt ref cfg

Dyn vlt margin	Voltage margin for the flux regulation
Int Outvlt lim	Limit of the output voltage

Output vlt ref 0mon

Available Outvlt	Monitor for the maximum available output voltage. It is calculated directly starting from the DC link voltage.
In use Outvlt ref	Limit in use on the output voltage

The limit in use on the output voltage is calculated as follows:

- The starting point is the *Available Outvlt*;
- This is limited by the *Int Outvlt lim*;
- The *Dyn vlt margin* is applied on the resulting value.

1.11 STOP OPTION CONTROL (STOP OPTION)

1.11.1 Direct Current Braking Control - DC Braking

The Function allows to stop the motor with a direct current braking.

The current injection can be activated via an external command, via the ***DCbrake cmd src*** source or automatically via an internal command when the stop command is performed. Such command can be activated by setting **DCbrake mode** = "at stop".

It is possible to have simultaneously both the internal and the external command. They both work on a OR logic.

Furthermore, the function is made of:

- a waiting phase between the command emission and the duration of the programmable injection
- a direct current injection phase, whose intensity and duration can be programmed.

Via **DCBrake delay** it is possible to set the waiting phase between the command and the injection duration.

NOTE! If the external command is a pulse shorter than the programmed injection time, the injection phase lasts for the programmed time. If the external command is a pulse longer than the programmed injection time, the injection phase lasts till the end of the external command.

With **DCBrake duration** it is possible to set the current injection duration while **DCBrake current** allows to set the current intensity.

Description:

```
STOP OPTION      DC braking
                     DCbrake mode
                     DCbrake delay
                     DCbrake duration
                     DCbrake current
                     DCbrake cmd src
                     Dcbrake state
STOP OPTION      SAVE PERAMETERS
```

`DCbrake mode`	Off - At Stop: internal command (standard Off).
`DCbrake delay`	delay between the injection command and the injection of the current itself (standard 0.5sec).
`DCbrake duration`	duration of the current injection. See the note about the external command
`DCbrake current`	braking current as a percentage of **Drive continuos current** (standard 50%)
`DCbrake cmd src`	external command source (standard NULL)
`DCbrake state`	DC Brake state . Active, non-active.

1.11.2 Power Loss Control (Power Loss Ctrl)

The Function allows to control a power loss or a break of the Mains voltage.

In the configurations, via the *PL function sel* parameter, it is possible to set several methods to control a possible power loss:

PL Off	the function is not active
PL ridethru	with this setting it is possible to let the motor shaft rotate as long as possible during some Mains holes. The DC link voltage is controlled in order to be kept slightly higher than the Undervoltage threshold, thus minimizing the losses. In this case the Mains hole is considered to be temporary and a crossing attempt is performed The control variable is an additional reference for the torque current (negative).
PL stop	it is a controlled stop during which, through the energy recovered from the load, the motor is constantly controlled. The DC link voltage is controlled in order to be kept closed to the *PLS Vdc ref* reference (internal value, it is usually closed to the Overvoltage voltage - standard 648V). In this case the aim is to try to perform a controlled stop of the machine. The control variable is the torque current limit.

A signal, PL Next factor, supplies the ratio between the motor speed and the speed reference. By connecting it to the speed ratio of the slave drive, it is possible to obtain the line synchronism.

The settings of **Powerloss ridethru** and **Powerloss stop** can be performed in the specific submenus (see the following paragraphs).

NOTE! This function is not active in case of a functioning condition with a 230V main voltage.

Description:

```
STOP OPTION  Power loss ctrl
             Pwrloss ctrl cfg
                 PL function sel
                 PL acceleration
                 PL deceleration
             Pwrloss ctrl mon
                 PL next active
                 PL next factor
STOP OPTION  SAVE PERAMETERS
```

The following functions are common to the functionalities. The specific sections are described on the following pages.

Power loss ctrl cfg

PL function sel	It allows to make a selection among the PL stop, PL ridethru and Off function. This function has to be enabled only on the line **Master** drive.
PL acceleration	setting of the acceleration time when the powerloss stop function is active. (standard 100 rpm/s).
PL deceleration	A gradual deceleration allows to avoid sudden torque changes when the powerloss stop function is active. The ramp, anyway, must be so fast as to allow the inter vention of the function itself.(standard 10000 rpm/s).
PL next active	It states that the slave motor speed is equal to the master motor speed.
PL next factor	Relationship between Ramp ref / Speed ref and Motor speed. It is the slave reference in order to decrease the speed, in a linear way, according to the master drive speed.

1.11.2.1 Power Loss Ridethru (Pwrloss Ridethru)

When the DC link voltage reaches the starting threshold, the function gets active.

The DC link setpoint is set with a value higher than 12% as compared to the Undervoltage threshold.

The PI regulator controls a negative torque current (recovery) in order to keep the DC link at a constant level. When the Mains voltage is restored, the system allows a delay on the line speed with the set acceleration time.

Description:

```
STOP OPTION      Power loss ctrl
                     Pwrloss ridethru
                         Pwrloss ride cfg
                             PLR P Gain
                             PLR I Gain
                         Pwrloss ride mon
                             PLR active
STOP OPTION      SAVE PERAMETERS
```

Pwrloss ridethru cfg	
PLR P Gain	Proportional gain in A/V
PLR I Gain	Integral gain in A/V/s
Pwrloss ridethru mon	
PLR active	It states the function state

1.11.2.2 Power Loss Stop (Pwrloss Stop)

Through the ***PSL mains st src*** source, the function allows the selection of the command signal, which can state the Mains recovery (for example via a programmed digital input). The aim is to restart the motor before it reaches a Speed 0. In the configurations it is possible to set the gain of the internal *PI* regulator, the DC link reference threshold with *PLS Vdc ref*, the torque current limit with *PLS curr lim* and with *PLS timeout* a maximum period after which no automatic restart is possible.

Description:

```
STOP OPTION      Power loss ctrl
                 Pwrloss stop
                     Pwrloss stop src
                         PLS mains st src

                     Pwrloss stop cfg
                         PLS P gain
                         PLS I gain
                         PLS Vdc ref
                         PLS curr lim
                         PLS timeout
                     Pwrloss stop mon
                           PLS active
STOP OPTION      SAVE PERAMETERS
Pwr loss stop src
```

PLS mains st src	The drive is informed about the restore of the Mains voltage in order to restart the motor before it reaches the zero speed. The command can be given via the keypad, a programmable digital input, the serial line or the Bus (standard NULL).
Pwr loss stop cfg	
PLS P gain	Proportional gain in A/V of the PI regulator for the power loss stop function.
PLS I gain	Integral gain in A/V/s of the PI regulator for the power loss stop function
PLS Vdc ref	Reference for the DC link voltage during the activity period of the power loss stop function. **If the braking unit** is used to obtain shorter stopping times, the parameter setting has then to **be higher** than the value of the **ON threshold on the braking unit.** The value (standard 648V), in any case, has not to be higher than the threshold of the Overvoltage alarm.
PLS cur lim	Setting of the torque current limit used during the activity period of the power loss stop function. When the function is active, the parameter has the priority on T curr lim.
PLS timeout	Periodo oltre il quale non è più possibile un riavvio automatico.
Pwr loss stop mon	
PLS active	Period of time after which no automatic restart is possible.

When the PLS timeout has expired, a **PLS timeout act** alarm is given. Its reset allows the system to restart.

Pwrloss stop function APPLICATIONS

When the DC link voltage goes under the power loss detection threshold, the **Powerloss stop** function gets active. The power loss detection threshold is internally selected in order to be higher than the undervoltage level. The Drive has a Speed 0 reference with a ramp defined by the **PL deceleration** parameter (it can be set in Pwrloss ctrl cfg) .

During this phase, a PI regulator (which can be set via *PLS P gain* and *PLS I gain*) tends to keep the DC link voltage with the **PLS Vdc ref** value. The control variable is given by the current limit together with the limit set in the parameter.

PLS curr limit . The deceleration depends therefore on the recovery current and on the load inertia (Higher inertia equal to longer stopping times).

The deceleration time is used to make the transition to the function activation smoother.

The DC link voltage is regulated according to the value set by the **PLS Vdc ref** parameter. Its default setting is lower than 5% as compared to the intervention threshold of the braking unit.

With applications requiring the use of the braking unit, the **PLS Vdc ref** parameter can be set by hand at a higher level as compared to the braking threshold.

The device takes advantage of the intervention of the braking unit thus reaching a stop condition in a specific period of time. Also the current limit defined by the **PLS curr limit** parameter has to be set in order to meet the requirements of the braking period.

It is possible to monitor the activity of the power loss stop function on a digital output programmed as **PLS active**.

If the Mains Voltage is restored within the period set by the **PLS timeout** parameter, the motor, after reaching the Speed 0, is automatically brought by the Drive to function again with its starting speed and with a ramp acceleration time defined by **PL acceleration**.

If the Mains Voltage is restored but **PLS timeout** expires before the motor reaches the zero speed, it is necessary to give to the Drive the **PL time-out ack** digital command in order to start the system again and go back to the starting speed.

The **PLS timeout** elapsing time can be monitored on a programmable digital output set as **PL time-out sig**.

During the power loss period, it is possible to restart the system before the motor has reached the Speed 0 when the Drive receives a signal stating the Mains Voltage recovery. The signal must be connected to **PL mains st src**. Such signal can be supplied, for example, by **SR-32** or **SM-32** line converters.

In a configuration with a multiple drive/motor, where a coordinated stop is usually required, the master Drive must have, together with the **Enable Mst and Enable Slv** programming**,** an analog output set as **PL next factor**.

The **PL next factor** signal sets the ratio between the line speed and the present speed.

It must be connected to the **Speed ratio**. When the power loss is detected, the master speed decreases according to the ratio calculated between **Speed ref** and **Motor speed**.

Such ratio states the reference for the slave, in order to decrease the speed in a linear way according to the speed of the master Drive. The motor functioning at a speed controlled by the master can be monitored on a digital output of the master drive programmed as **PL next active**.

With a configuration for a multiple motor, such function can be performed only with the Drives connected on common DC buses.

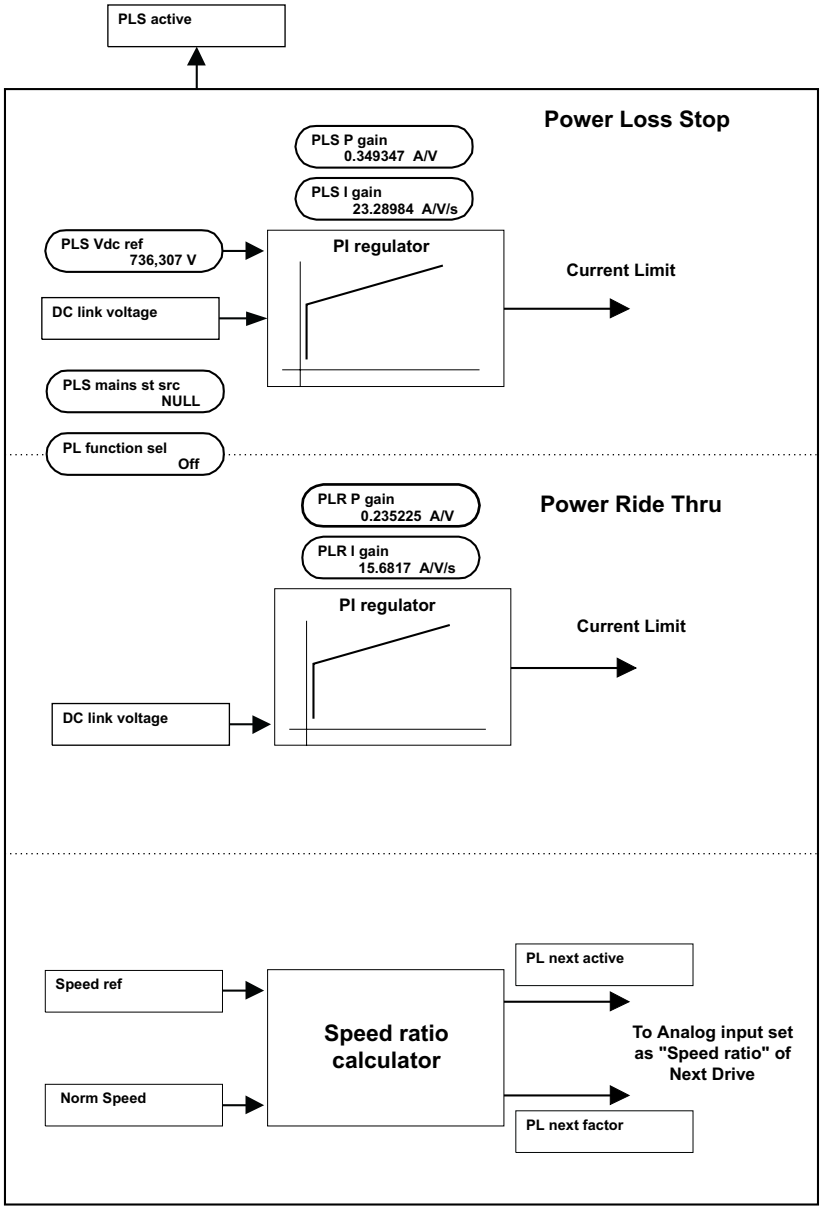


Figure 1.11.2.1: Power Loss Control Function

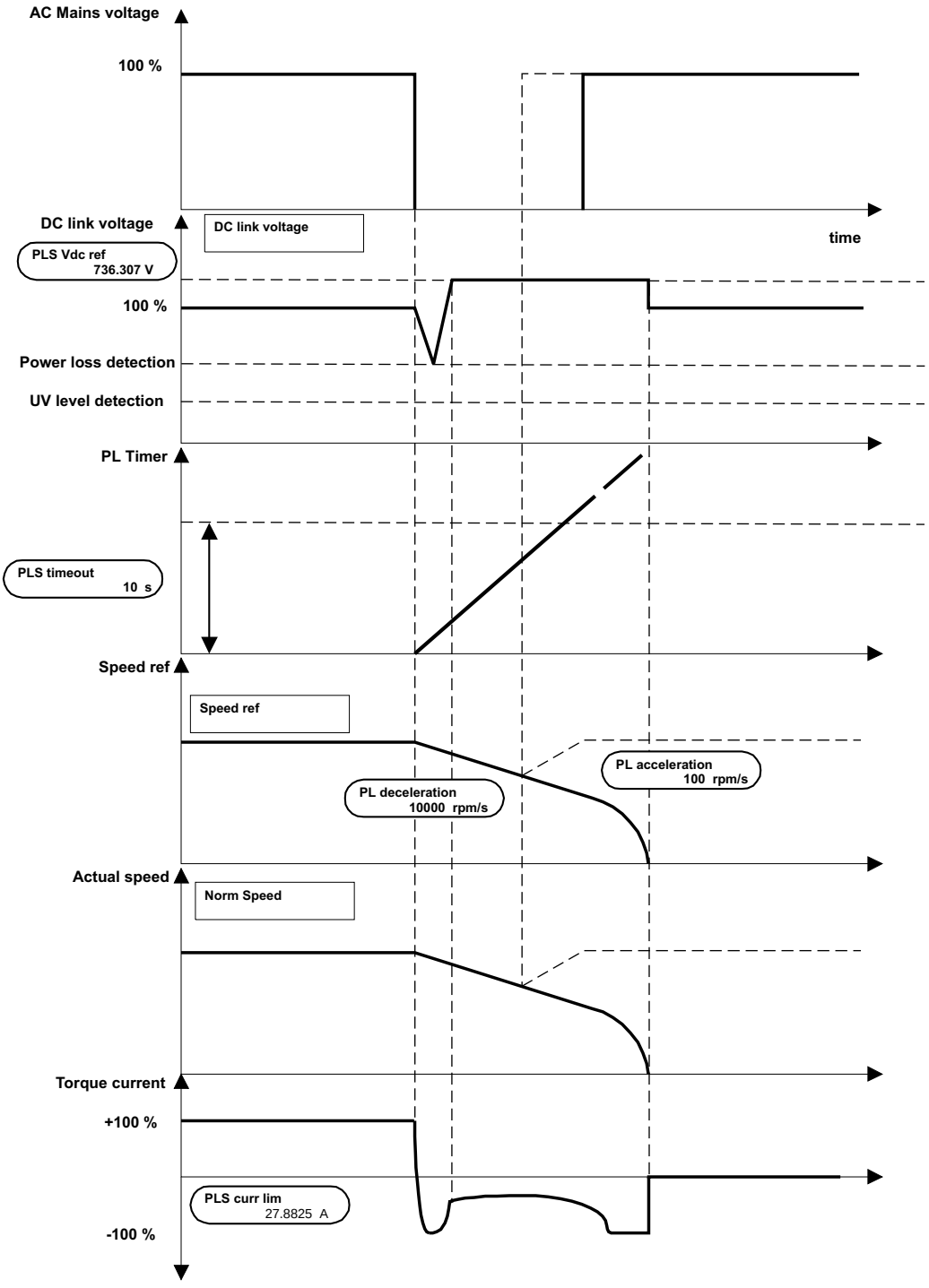


Figure 1.11.2.2: Power Loss Stop

1.12 ALARM BLOCK CONFIGURATIONS (ALARM CONFIG)

This chapter describes how to control the several Drive alarms.

1.12.1 Alarms

The word “alarms” refers to two different error families. They are:

- Errors due to a wrong setting of the Drive parameters
- Intervention of the Drive protection systems

The former occur during the drive configuration phase and state, for example, the presence of parameter sets which can not be combined or which overcome the Drive limits.

The solution is checking the entered parameters and resetting them if possible.

The latter are indications about the intervention of protection systems, which could cause the Drive stop. In this case the alarm cause has to be found and reset.

1.12.2 Alarm State

The alarm cause can be:
- Active
- Non-active

The alarms have displayed via the Alarm List . It shows all the occurred alarms, both if they are due to protections and to errors on the overcome limit values.

In order to disappear from the alarm list they have to be recognized. The recognition is possible only if the alarm is no more active. The alarms are automatically recognized after two minutes.

The drive State Machine, controls the drive running and starting, accounting for protection & alarming, command sequence, and reset status.

The waiting phase for the State Machine reset is showed in the Alarm List as Sequencer.

The table below displays various operation states by Sequencer status number:

Sequencer status	State
1	Magnetization running
2	Magnetization completed, Stop
3	Start
4	Fast stop, Stop
5	Fast stop, Start
9	No alarm, drive is ready to accept all commands
10	Magnetization running and Start command already present
12	Alarm active
16	Alarm not active, waiting for reset

TAV3i020

Sequencer status : 6..8, 11,13..15 and 17..21 = for internal use.

The Sequencer status of the State Machine are showed in the “**STATUS/Advanced status**” menu, through ***Sequencer status*** parameter.

1.12.3 Alarm List and Alarm Recognition

When a new regulation alarm is active, the Red led "Alarm" blinks on the display.

By pressing **Shift + Alarm** it is possible to reach the "Alarm list" page, which lists the intervened and not yet recognized but also the recognized and still active alarms.

In case a regulation alarm intervenes with Restart=Off (that is without an automatic restart after the alarm has been reset), also the Sequencer (State machine) alarm gets active.

The alarm recognition can be performed by reaching the "Alarm list", selecting the alarm to be recognized and pressing **Enter**. If the alarm is recognized and inactive, it is cancelled from the list.

When all the alarms have been recognized, the Red led "Alarm" on the display is lighted (the Sequencer alarm of the State Machine remains active).

The Red led is lighted till all the alarms become inactive and the user resets the State Machine (such command can be given, for example, via the keypad with the "red" stop **button).**

If all the alarms on the drive have been recognized (the Red led is lighted) and a new regulation alarm intervenes, such condition is reported with the blinking of the Red led on the display.

NOTE! It is possible to reset the regulation alarms without recognizing them. In this case the Drive is active and the Red led blinks (no action in the alarm list has to be performed).

1.12.4 Alarm Log

This is the historic register Log, stating what happened on the Drive. It records those Drive alarms considered to be significant. The alarm register is in the STATUS menu. It has 30 entry.

1.12.5 Alarm Configurations

In the **Alarm config** menu it is possible to configure the different alarms (xxx) on the following points:

`xxx activity`	Activity to be performed in case an alarm occurs
`xxx restart`	Restart enabling
`xxx restart time`	Restart time
`xxx hold off`	Hold off time

Paragraph 2.9.6 states the possible settings referring to each alarm type.

1.12.5.1 Hold Off Time

With this parameter it is possible to set the period of time, in which a specific situation has to remain active (it has to persist) in order to be considered an alarm situation. It is possible to set a millisecond period of time, in which the Drive does not recognize the alarm state. Therefore, the alarm is recognized only if it persists for a period longer than the set Hold off time.

1.12.5.2 Activity

With this parameter it is possible to set the action to be performed after the alarm intervention.

0	=>	**Only msg alarmq**	Actions: msg				
1	=>	**Ignore**	Actions: none				
2	=>	**Disable drive**	Actions: msg	–	commands for SM	–	Status.
3	=>	**Stop**	Actions: msg	–	commands for SM	–	Status.
4	=>	**Fast stop**	Actions: msg	–	commands for SM	–	Status.
5	=>	**Curr limstop**	Actions: msg	–	commands for SM	–	Status.
6	=>	**Warning**	Actions: msg	–	Status		
7	=>	**Not allowed**	Actions: msg	–	Status		

msg :	The message has been sent to the alarm list and to the alarm config list.
State Machine commands :	A change in the drive state has been forced (alarm intervention).
Status:	The active alarm signal is immediately set; it is reset when the alarm is nmore present and the state machine is not in an alarm condition.

1.12.5.3 Restart

With this parameter it is possible to enable the **automatic start after the alarm cause has been removed.**

```
0 => Off
1 => On
```

1.12.5.4 Restart Time

With this parameter it is possible to **set a period of time,** within which the **alarm state has to be removed, in order to perform an automatic start.**

1.12.6 Regulation Alarm Reset

When a regulation alarm intervenes, the Drive reaches the alarm state. Such alarm state can be reset when the alarms are no more active and the user performs a “Reset Alarm” command Transition 0=>1.

By using the ***Fault reset src*** source, it is possible to select the origin of the “reset” command signal (for example a command via the terminal strip through a digital Input).

How to perform a “**Reset Alarm**” command:

Via the keypad:	by pressing the Red key.
Via the terminal strip:	connect the “Fault reset src” Pin to a digital input. Transition 0=>1.
Via Digital (Serial – Bus – Dgfc) :	connect the “Fault reset src” Pin to a bit of the decomposed word and set the decomposed word. Transition 0=>1.

NOTE! if the “Fault reset src” Pin is connected to a digital input, such input has to be kept at a low logic state. If such state is high, the first “Fault reset” command via the Red key has no effect.

Description:

ALARM CONFIG

Fault reset
- Fault reset src

Undervoltage
- UV restart
- UV restart time

Overvoltage
- OV restart
- OV restart time

IGBT desaturat
- DS restart
- DS restart time

Inst overcurrent
- IOC restart
- IOC restart time

Ground fault
- GF activity
- GF threshold

External fault
- EF src
- EF activity
- EF restart
- EF restart time
- EF hold off

Motor OT
- MOT activity
- MOT restart
- MOT restart time
- MOT hold off

Heatsink S OT
- HTS activity
- HTS restart
- HTS restart time
- HTS hold off

Regulation S OT
- RGS activity
- RGS restart
- RGS restart time
- RGS hold off

Intake air S OT
- IAS activity
- IAS restart
- IAS restart time
- IAS hold off

ISBus fault
- ISB activity

ISB restart
ISB restart time
Comm card fault
CCF activity
CCF restart
CCF restart time
Appl card fault
ACF activity
Drive overload
DOL activity
Motor overload
MOL activity
BU overload
BUOL activity
Fwd Rev Ctrl
FRC activity
FRC hold off
Overspeed
OS activity
OS threshold
OS hold off
Spd fbk loss
SFL activity
UV repetitive
UVR attempts
UVR delay
Hw fault
Hw fault mon

ALARM CONFIG **Alarm status**

Alm status cfg
Mask W1 S1
Mask W2 S1
Mask W3 S1
Mask W1 S2
Mask W2 S2
Mask W3 S2

Alm status mon
Alm W1 S1
Alm W2 S1
Alm W3 S1
Alm W1 S2
Alm W2 S2
Alm W3 S2

ALARM CONFIG SAVE PARAMETERS

1.12.7 Alarm Status on a Digital Variable

The alarm state can be reported via three Words.

Each bit determines an alarm state. It is therefore possible to determine the state of 48 alarms.

Each single bit can be controlled if the corresponding bit of a specific mask is set with 1, otherwise their setting is always 0.

When an alarm becomes active, the word corresponding bit is set with 1. Its setting remains equal to 1 until the alarm becomes inactive and the "State Machine or Sequencer" is not in an alarm condition (see the previous paragraphs).

If the state of a single alarm has to be controlled via an output, then only the mask needed bit has to be set with 1.

If the state of several alarms has to be controlled via an output, then the mask corresponding bits have to be set with 1.

The alarms have to be controlled by the Word itself.

Ex: the state of the External fault alarm has to be read.

```
Mask W1 S1 = 0x0100  => 0000 0001 0000 0000
Mask W2 S1 = 0x0000  => 0000 0000 0000 0000
Mask W3 S1 = 0x0000  => 0000 0000 0000 0000
```

DO 0 src = Select ipa Alm W1 S1.

The state of the Undervoltage and Overvoltage alarm has to be read.

```
Mask W1 S1 = 0x0100  => 0000 0000 0000 0110
Mask W2 S1 = 0x0000  => 0000 0000 0000 0000
Mask W3 S1 = 0x0000  => 0000 0000 0000 0000
```

DO 0 src = Select ipa Alm W1 S1.

The state of the External fault and F_R_C alarm has to be read.

```
Mask W1 S1 = 0x0100  => 0000 0001 0000 0000
Mask W2 S1 = 0x0000  => 0000 0000 1000 0000
```

DO 0 src = Select ipa Alm W1 S1.

DO 1 src = Select ipa Alm W2 S1.

See "Alarm List" table in the next page

Table 1.12.1: Alarm List

ALARM NAME	BIT position in the alarm Word	Description (Cause of fault)	Drive activity after Alarm	HOLD OFF	Restart	Restart time	Acknowledgment request	Msg ad alarmq	DigOut
Failure supply	1	Failure of power supply	Disable drive	No	No	No	Yes	Yes	Yes
Undervoltage	2	Vdc Link< UV Thr	Disable drive	No	Yes. logic on n° times	Yes	Yes	Yes	Yes
Overvoltage	3	Vdc Link> OV Thr	Disable drive	No	Yes	Yes	Yes	Yes	Yes
IGBT desaturat	4	Too many current on output bridge	Disable drive	No	Yes. logic on 2 alarms in 30 second	Yes	Yes	Yes	Yes
Inst overcurrent	5	Too many current on output bridge	Disable drive	No	Yes. logic on 2 alarms in 30 second	Yes	Yes	Yes	Yes
Ground fault	6	Output Phase discharge to ground	Programmable	No	No	No	Yes	Yes	Yes
Curr fbk loss	7	Loose of the reading of the current sensor	Disable drive	No	No	No	Yes	Yes	Yes
External fault	8	Input pin. Programmable	Programmable	Yes. Programmable	Yes	Yes. Programmable	Yes	Yes	Yes
Spd fbk loss	9	Loose of the reading of the speed sensor	Programmable	No	No	No	Yes	Yes	Yes
Module OT	10	Only for size <= 15Kw Module Overtemperature	Disable drive	Yes Fixed 10 msec	No	No	Yes	Yes	Yes
Heatsink OT	11	Only for size > 15Kw Heatsink Overtemperature	Disable drive	Yes Fixed 1000 msec			Yes	Yes	Yes
Motor OT	12	Input Motor Overtemperature	Programmable	Yes. Programmable	Yes	Yes. Programmable	Yes	Yes	Yes
Heatsink S OT	13	Heatsink Overtemperature	Programmable	Yes. Programmable	Yes	Yes. Programmable	Yes	Yes	Yes
Regulation S OT	14	Regulation Overtemperature	Programmable	Yes. Programmable	Yes	Yes. Programmable	Yes	Yes	Yes
Intake air S OT	15	Only > 15Kw Intake air overtemperature	Programmable	Yes. Programmable	Yes	Yes. Programmable	Yes	Yes	Yes
ISBus fault	16	Isbus card	Programmable	No	Yes	Yes. Programmable	Yes	Yes	Yes
Comm card fault	17	Sbi Card	Programmable	No	Yes	Yes. Programmable	Yes	Yes	Yes
Appl card fault	18	Dgfc card	Disable drive	No	No	No	Yes	Yes	Yes
Drive overload	19	Reached Drive Ovld limit	Programmable	No	No	No	Yes	Yes	Yes
Motor overload	20	Reached Motor Ovld limit	Programmable	No	No	No	Yes	Yes	Yes
BU overload	21	Reached BU Ovld limit	Programmable	No	No	No	Yes	Yes	Yes
Data lost	22	Eeprom error	Disable drive	No	No	No	Yes	Yes	Yes
Fwd Rev Ctrl	23	Fwd and Rev both high	Programmable	No	No	No	Yes	Yes	Yes
Max time	24	Exceeded max CPU time	Disable drive	No	No	No	Yes	Yes	Yes
Sequencer	25	State machine error	Disable drive	No	No	No	Yes	Yes	No
PLS timeout	26	Power loss Stop	Disable drive	No	No	No	Yes	Yes	Yes
Overspeed	27	Actual speed > theshold with drive running.Programmable	Programmable	Yes. Programmable	No	No	Yes	Yes	Yes
UV repetitive	28	In 5 minutes xx UV fault occoured. Xx progammable. If xx is set equal to the maximun the alarm is disable.	Disable drive	No	No	No	Yes	Yes	Yes
IOC repetitive	29	2 UC fault in 30 second	Disable drive	No	No	No	Yes	Yes	Yes
IGBTdesat repet	30	2 DES fault in 30 second	Disable drive	No	No	No	Yes	Yes	Yes
WatchDog user	31	User Watchdog not refreshed	Disable drive	No	No	No	Yes	Yes	Yes
Hw fail	32	Loose of sincronization with expansion or peripherals	Disable drive	No	No	No	Yes	Yes	Yes

Alarms table

1.12.8 Fault Pin

The state of those alarms having an activity different from Ignore and Only msg alarm is stated on this variable.

No active alarm => 0x0000

One active alarm => Number of the corresponding pin

Several active alarms => Last intervened alarm

Reset alarms => Last intervened alarm. Set with 0x0000 the "alarm Reset" command.

The variable can be read via the serial line, field bus and Dgfc.

ALARM Name	Bit position in the alarm Word	Code in the alarm LIST
Failure supply	1	21
Undervoltage	2	22
Overvoltage	3	23
IGBT desaturat	4	24
Inst overcurrent	5	25
Ground fault	6	26
Curr fbk loss	7	27
External fault	8	28
Spd fbk loss	9	29
Module OT	10	30
Heatsink OT	11	31
Motor OT	12	32
Heatsink S OT	13	33
Regulation S OT	14	34
Intake Air S OT	15	35
ISBus fault	16	36
Comm card fault	17	37
Appl card fault	18	38
Drv overload	19	39
Mot overload	20	40
BU overload	21	41
Data lost	22	42
Fwd Rev Ctrl	23	43
Max time	24	44
Sequencer	25	45
PLS timeout	26	46
Overspeed	27	47
UV repetitive	28	48
IOC repetitive	29	49
IGBTdesat repet	30	50
WatchDog user	31	51
Hw fail	32	52

Fault pin table

Table 1.12.8.1: Fault Pin List

1.13 SERIAL COMMUNICATIONS (COMMUNICATION)

1.13.1 Communication via the RS485 Serial Port (RS485)

The used communication protocol, called Slink4, allows a **multipoint network.**

See the specific manual for further details.

The Drive address can be defined via the *Slink4 address* parameter.

The address change is performed by writing the **105** parameter, *SLink4 address*, and by saving the new value. The address becomes active after the Drive has been switched off and on.

Via the S_link4 command a temporary address change is also possible.

The RS485 serial line is a Half-Duplex line, where the data can not be transmitted and received simultaneously.

It happens sometimes that during the transmission to reception switching phase the Master (PC or PLC) reaches the reception condition **after** the Drive **has already started to send** its data package. As a consequence, the package received by the Master is not correct.

In order to avoid such an inconvenience, it is possible to use the *SLink4 res time* parameter, through which it is possible to set a delay time on the Drive response in case of problems during the Tx to Rx switching on the Master.

Description:

COMMUNICATION	**RS485**	
	SLink4 address	
	SLink4 res time	Response delay (in milliseconds, msec)

1.13.2 Communication via the SBI Bus Field Card (SBI)

The communication with the SBI Bus field option cards (Serial Bus Interface) is performed via two channels:

- Synchronous or Process channel (PDC Process Data Channel) for a cyclical value interchange.
- Asynchronous or Configuration channel for a low priority access to all the Drive parameters.

As for the data exchange modes between the SBI card and the Network see the SBI card documentation.

The process data exchange between the Drive and the SBI has the following structure:

The interface is made of six writing Words and six reading Words.

The source Drive parameter has to be defined for the six Words transmitting the data from the Drive to the SBI. '**Drv -> SBI word**'

Six Words move the data from the SBI to the Drive. '**SBI -> Drv word**'

These can be found in the source selection lists.

For more information to see the following documents for related information on SBI:

GEI 100422 for S6KCV301PDP33 card

GEI 100435 for S6KCV301DNET

Description:

```
COMMUNICATION    SBI
                 SBI config
                     SBI enable
                 SBI monitor
                     Last SBI error
                 Drv->SBI word
                     Drv->SBI W src
                         Drv SBI W0 src
                         Drv SBI W1 src
                         Drv SBI W2 src
                         Drv SBI W3 src
                         Drv SBI W4 src
                         Drv SBI W5 src
                     Drv->SBI W cfg
                         Int Drv SBI W0
                         Int Drv SBI W1
                         Int Drv SBI W2
                         Int Drv SBI W3
                         Int Drv SBI W4
                         Int Drv SBI W5
                     Drv->SBI W mon
                         Drv SBI W0 mon
                         Drv SBI W1 mon
                         Drv SBI W2 mon
                         Drv SBI W3 mon
                         Drv SBI W4 mon
                         Drv SBI W5 mon
                 SBI->Drv word
                     SBI->Drv W mon
                         SBI Drv W0 mon
                         SBI Drv W1 mon
                         SBI Drv W2 mon
                         SBI Drv W3 mon
                         SBI Drv W4 mon
                         SBI Drv W5 mon
COMMUNICATION    SAVE PARAMETER
```

COMMUNICATION SBI

SBI Config

SBI enable	It enables the communication initialization with the SBI when the Drive is started. If the SBI card is not found, the communication is disabled and the Comm card fault alarm gets active.

SBI Monitor

Last SBI error	It defines the last found error: 0 = OK, 1 = Hw fault, 2 = Bus Loss

Drv->SBI Word

Drv->SBI W src	
Drv SBI W0 src	Word 0 channel source of the PCD channel on the Drive output
.....	.....
Drv SBI W5 src	Word 5 channel source of the PCD channel on the Drive output

Drv->SBI word

Drv->SBI W cfg	
Int Drv SBI W0	Internal value configuration (standard connected on W0 src)
.....	.....
Int Drv SBI W5	Internal value configuration (standard connected on W5 src)

Drv->SBI word

Drv->SBI W mon	
Drv SBI W0 mon	Word 0 monitor of the PDC channel on the Drive output
.....	.....
Drv SBI W5 mon	Word 5 monitor of the PDC channel on the Drive output

SBI->Drv word

SBI->Drv W mon	
SBI Drv W0 mon	Word 0 monitor of the PDC channel on the Drive input
.....	.....
SBI Drv W5 mon	Word 5 monitor of the PDC channel on the Drive input

1.14 APPLICATION CARD CONFIGURATION (APPL CARD CONFIG)

1.14.1 Configuration of the DGFC Option Card (DGFC)

The communication between the Drive and the DGFC is performed via two channels for each direction.

· Drive -> DGFC: **Drv->DGFCS** 5 writing Words - **Drv->DGFCA** 10 writing Words

As for the Words sending the data from the Drive to the DGFC it is necessary to define the Drive source parameter.

· DGFC-> Drive: **DGFCS->Drv** 5 reading Words - **DGFCA->Drv** 10 reading Words

The Words move the data from the DGFC to the Drive. They can be found in the source selecting lists.

The communication channels are synchronous.

(they are divided into synchronous and asynchronous if the previous software version is taken into consideration. Synchronous channels with 4mS and Asynchronous channels with 16 mS).

DGFC enabling:

DGFC enable it enables the communication initialization of the card at its starting.
If the Drive does not find the DGFC, the "Appl card fault" alarm gets active and the regulation execution is not started.

For more information to see the following document for related information on DGFC:

USER MANUAL for S6KCV301DGF card

Description:

```
APPL CARD CONFIG DGFC
                 DGFC config
                     DGFC enable
                 DGFC menu
                 DGFC sync Ch
                     Drv->DGFCS W src
                         Drv DGFC-S W0src
                         Drv DGFC-S W1src
                         Drv DGFC-S W2src
                         Drv DGFC-S W3src
                         Drv DGFC-S W4src
                     Drv->DGFCS W cfg
                         Int DrvDGFC-S W0
                         Int DrvDGFC-S W1
                         Int DrvDGFC-S W2
                         Int DrvDGFC-S W3
                         Int DrvDGFC-S W4
                     Drv->DGFCS W mon
                         Drv DGFC-S W0mon
                         Drv DGFC-S W1mon
```

```
        Drv DGFC-S W2mon
        Drv DGFC-S W3mon
        Drv DGFC-S W4mon

    DGFCS->Drv W mon
        DGFC-S Drv W0mon
        DGFC-S Drv W1mon
        DGFC-S Drv W2mon
        DGFC-S Drv W3mon
        DGFC-S Drv W4mon
DGFC async Ch
    Drv->DGFCA W src
        Drv DGFC-A W0src
        Drv DGFC-A W1src
        Drv DGFC-A W2src
        Drv DGFC-A W3src
        Drv DGFC-A W4src
        Drv DGFC-A W5src
        Drv DGFC-A W6src
        Drv DGFC-A W7src
        Drv DGFC-A W8src
        Drv DGFC-A W9src
    Drv->DGFCA W cfg
        Int DrvDGFC-A W0
        Int DrvDGFC-A W1
        Int DrvDGFC-A W2
        Int DrvDGFC-A W3
        Int DrvDGFC-A W4
        Int DrvDGFC-A W5
        Int DrvDGFC-A W6
        Int DrvDGFC-A W7
        Int DrvDGFC-A W8
        Int DrvDGFC-A W9
    Drv->DGFCA W mon
        Drv DGFC-A W0mon
        Drv DGFC-A W1mon
        Drv DGFC-A W2mon
        Drv DGFC-A W3mon
        Drv DGFC-A W4mon
        Drv DGFC-A W5mon
        Drv DGFC-A W6mon
        Drv DGFC-A W7mon
        Drv DGFC-A W8mon
        Drv DGFC-A W9mon
    DGFCA->Drv W mon
        DGFC-A Drv W0mon
        DGFC-A Drv W1mon
```

DGFC-A Drv W2mon
DGFC-A Drv W3mon
DGFC-A Drv W4mon
DGFC-A Drv W5mon
DGFC-A Drv W6mon
DGFC-A Drv W7mon
DGFC-A Drv W8mon
DGFC-A Drv W9mon

APPL CARD CONFIG SAVE PARAMETERS

DGFC sync ch

Drv->DGFCS W src

Drv DGFC-S W0src	Source of the Word 0 channel on the Drive output
.....	.....
Drv DGFC-S W4src	Source of the Word 4 channel on the Drive output

Drv->DGFCS W cfg

Int DrvDGFC-S W0	Internal value configuration (standard connected to W0 src)
.....	.....
Int DrvDGFC-S W4	Internal value configuration (standard connected to W4 src)

Drv->DGFCS W mon

Drv DGFC-S W0mon	W0 monitor on the Drive output
.....	.....
Drv DGFC-S W4mon	W4 monitor on the Driveoutput

DGFCS->Drv W mon

DGFC-S Drv W0mon	W0 monitor on the Drive input
.....	.....
DGFC-S Drv W4mon	W4 monitor on the Driveinput

DGFC async ch

Drv->DGFCA W src

Drv DGFC-A W0src	Source of the Word 0 channel on the Drive output
.....	.....
Drv DGFC-A W9src	Source of the Word 9 channel on the Drive output

Drv->DGFCA W cfg

Int DrvDGFC-A W0	Internal value configuration (standard connected to W0 src)
.....	.....
Int DrvDGFC-A W9	Internal value configuration (standard connected to W9 src)

Drv->DGFCA W mon

Drv DGFC-A W0mon	W0 monitor on the Drive output
.....	.....
Drv DGFC-A W9mon	W9 monitor on the Drive output

DGFCA->Drv W mon

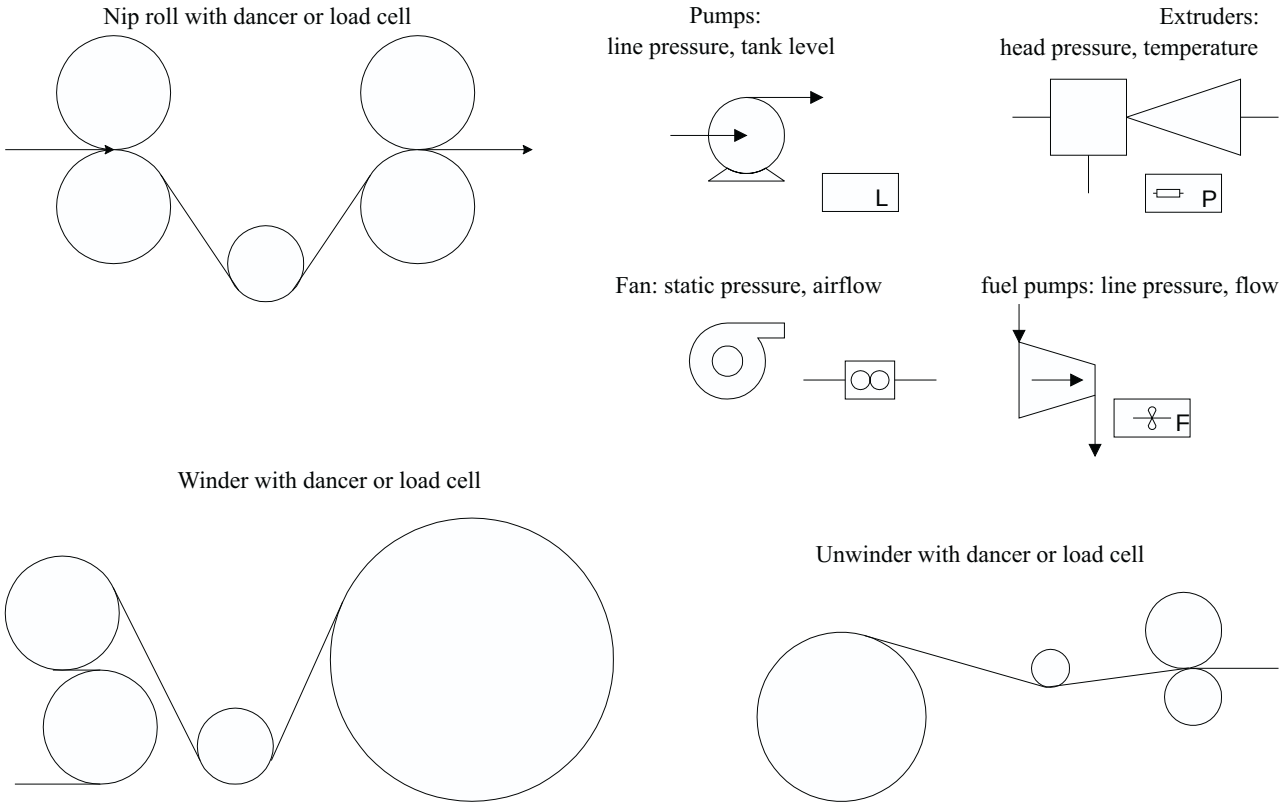
DGFC-A Drv W0mon	W0 monitor on the Drive input
.....	.....
DGFC-A Drv W9mon	W9 monitor on the Drive input

1.15 PID CONTROL (APPL FUNCTION)

The PID control is a free standing generic regulator inside the drive software.

It has the flexibility to tie the regulation of any process variable to drive speed or torque control, internal to the drive.

Common applications of PID regulation are:



Parameters for the PID feature are found under the APPL FUNCTION menu.

NOTE! The PID function cannot be used at the same time as the Power Loss control feature

The PID application examples fall under two categories:

1. process control - The process regulator is dynamic straightforward adjustment of the speed or torque setpoint of the drive to maintain the pressure, position, flow, temperature, etc.as needed by the process.

   Examples follow in sections 1.16.1, 1.16.2, 1.16.6 and 1.16.7
2. winder & unwinder control - The process regulator serves to scale a linespeed reference to account for material build up/ build down, proportional to the material diameter change.

   · The PID control allows the preset of the PID starting point for unwinding/winding rolls of varying sizes.

   · The diameter calculator feature, is a command to use the motor rotation and dancer position change to calculate material diameter before running the drive. This is a diameter preset feature without the need for external diameter sensing devices.

· The PID control provides the flexibility to reset the PID starting point for winding from the same starting size (empty core, mandrel, etc).

· Overwind/underwind control is provided by detecting the direction of speed reference and inverting the PID correction automatically.

· A diameter hold , using PID enable, can be commanded when transient conditions are known to disrupt the PID regulator, or the feedback is suspected to be incorrect. An example of this would be on a web break, where a dancer or load cell would lose contact with the material.

· Regulator gains can be programmed to be dependent on speed, drive variables, or other external means. This is important to account for varying torque requirements at a speed point where the roll may have no material buildup or a lot of material inertia.

· The PI and PD parts of the PID regulator are capable of being separately enabled.

Examples follow in sections 1.16.3, 1.16.4, 1.16.5 and 1.16.8.

Sections 1.15.1 -1.15.7 describe the PID regulator details

1.15.1 PID Control Enabling (Pid Function)

The Function enables the running of the different Blocks connected to the PID function.

Description:

```
APPL FUNCTION    PID
             PID function
                      PID enable
APPL FUNCTION    SAVE PARAMETERS
```

1.15.2 Feed Forward signal - PID Feed-Forward

The Block Function allows to state, if required, the Feed-Forward signal.

The ***PID inp FF src*** source selects the reference signal origin on the Block input.

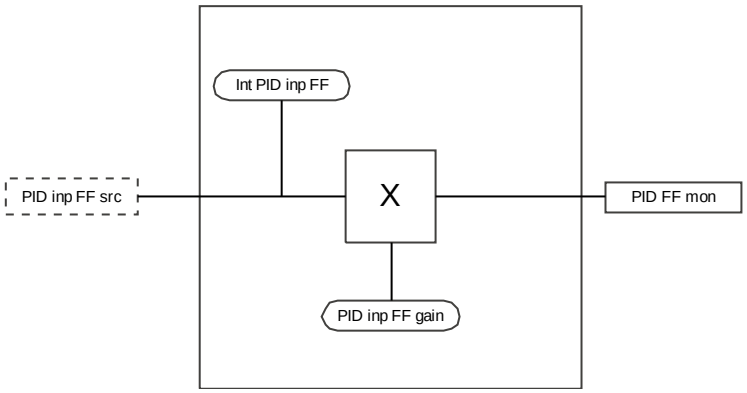
In the configurations, the feed-forward gain factor is stated via *PID inp FF gain*.

It is possible to select on the source an internal reference signal. Such value is defined by *Int PID inp FF*.

Description:

```
APPL FUNCTION    PID
                 PID feed-forward
                      PID FF src
                          PID inp FF src
                      PID FF cfg
                          Int PID inp FF
                          PID inp FF gain
                       PID FF mon
                          PID inp FF mon
                          PID FF mon
APPL FUNCTION    SAVE PARAMETERS
```

The Feed-Forward Block is shown in the figure below.



PID FF src

PID inp FF src	Definition of the feed-forward signal source

PID FF cfg

Int PID inp FF	Feed-forward internal reference
PID inp FF gain	Gain on the feed-forward signal

PID FF mon

PID inp FF mon	Monitor for the feed-forward input value
PID FF mon	Monitor for the feed-forward output value

1.15.3 PID Input Block (PID Input)

The Block calculates the **error value** of the PID Block.

Two input references are selected via an **internal selector.**

On the selected reference it is possible to **set a Ramp** and **to add an additional reference,** Pid Draw.

It is also possible to **limit** the output error value at the machine start and to select a **command** for the reaction of the PID section.

The ***PID set 0 src*** and ***PID set 1 src*** sources select the signal origin of the two input references:

PID seloff 0 src selects the command of the internal selector, ***PID draw src*** selects the additional reference signal and ***PID fbk src*** selects the reaction command of the PID section.

In the configurations it is possible to set the *variable* internal values, with *PID gain draw* to adapt the error gain, with *PID acc time* and *PID dec time* to set the reference ramp and with *PID clamp top* and *PID clamp bot* to set the upper and lower limit (see the paragraph "Dynamic Clamp").

The inputs are:
- · PID fbk src
- · PID draw src
- · PID set 0 src
- · PID set 1 src
- · PID seloff 0 src

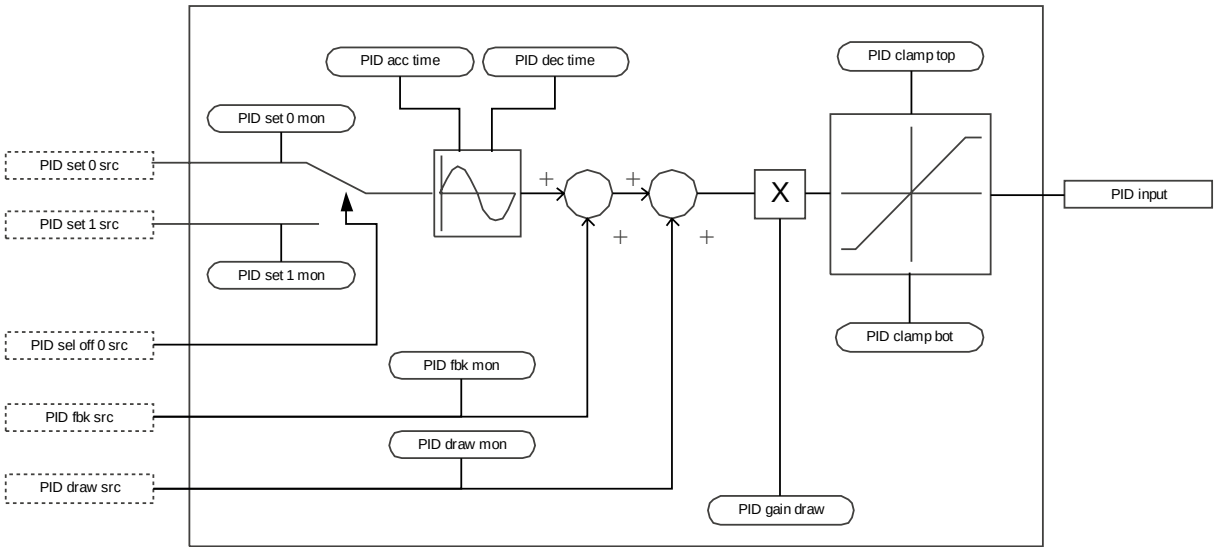
Description:

APPL FUNCTION **PID**
PID input

PID input src
PID fbk src
PID draw src
PID set 0 src
PID set 1 src
PID seloff 0 src
PID input cfg
Int PID fbk
Int PID draw
Int PID set 0
Int PID set 1
PID gain draw
PID acc time
PID dec time
PID clamp bot
PID clamp top
PID input mon
PID fbk mon
PID draw mon
PID set 0 mon
PID set 1 mon
PID input

APPL FUNCTION SAVE PARAMETERS

The PID Input Block is shown in the figure below.



PID input src

PID fbk src	Source selection of the PID section reaction
PID draw src	Source selection of the Draw (tension) reference
PID set 0 src	Setpoint 0 (reference) source selection
PID set 1 src	Setpoint 1 source selection
PID seloff 0 src	Source selection of the Setpoint selector

PID input cfg	
Int PID fbk	Internal value of the PID section reaction
Int PID draw	Draw internal value
Int PID set 0	Setpoint 0 internal value
Int PID set 1	Setpoint 1 internal value
PID gain draw	Value of the Setpoint adapting gain (feedback)
PID acc time	Acceleration time from 0 to 16384 (Normalized internal value)
PID dec time	Deceleration time from 16384 to 0 (Normalized internal value)
PID clamp bot	Lower clamp value (see dynamic clamp)
PID clamp top	Upper clamp value (see dynamic clamp)
PID input mon	
PID fbk mon	Monitor for the feedback value (reaction)
PID draw mon	Monitor for the active Draw value
PID set 0 mon	Monitor for the Setpoint 0 value
PID set 1 mon	Monitor for the Setpoint 1 value
PID input	Monitor for the Block output value

1.15.3.1 Dynamic Clamp Function

The Clamp value is active only until the error value becomes lower than the set Clamp range. The function is useful, for example, during starting with dancer which is completely sealed. In this case, the limiting of the maximum error limits the system reaction speed thus allowing a dancer smooth positioning. After positioning the dancer, the Clamp stops being active allowing a normal system control.

1.15.4 Integer Proportional Control (PI control)

The Function of this Block is performed by three strictly combined different Blocks. In order to obtain a better working homogeneity, they have been grouped into the same menu.

The three Blocks are:

PI control block	By starting from the line speed reference it states the error sign for the PI Block. It allows to invert the line direction without performing any operation, controls the signals for the temporary gain increase at the starting and controls the Integral section Block.
PI Gain scheduler	It allows to adapt the PI section gains according, for example, to the coil Diameter.
PI section	It is the Block where the PI regulator is performed. The feature of this regulator is a signal on the output oscillating between two values (Top and Bottom) which can be set. The output is multiplied by the Feed Forward value. In case of winders/unwinders, as stated before, the **Top limit and Bot limit** (Clamp) values are set in order to let this output represent the Minimum_Ray/Present_Ray ratio.

The ***PID PI enab src*** and ***PID I freeze src*** sources allow to select the origin of the enabling signals (*enable*/*disable*) of the **PI** function and of the freezing signals of the regulator **I**ntegral section.

PIGP ref src selects the input signal of the gain Adaptive; the Block function allows to set a three-segment Profile. In the Block it is possible to select, via an **internal selector,** three starting multiplication values: *Int PID Mtl PI 1, Int PID Mtl PI 2, Int PID Mtl PI 3*, internal values which can be set in the configurations.

The ***PID Mtl PI 3 src*** source connects standard the value of *Int PID Mtl PI 3*.

PID Mtl PI sel 0 and ***PID Mtl PI sel 1*** are the sources selecting the command signals of the internal selector. According to their condition, it is possible to state a combination determining the equivalent output **factor.**

The following table lists the factors corresponding to each different combination:

PID Mtl PI sel 1	PID Mtl PI sel 0		PID Mtl PI sel mon
0	0	0	*
0	1	1	Int PID Mtl PI 1
1	0	2	Int PID Mtl PI 2
1	1	3	**

TAVyS012

***** Last value calculated by Integral part is keep in memory.

****** **Factor** connected to ***PID Mtl PI 3 src*** source.

The inputs are:
- PID PI enab src
- PID I freeze src
- PIGP ref src
- PID Mtl PI sel 0
- PID Mtl PI sel 1
- PID Mtl PI 3 src

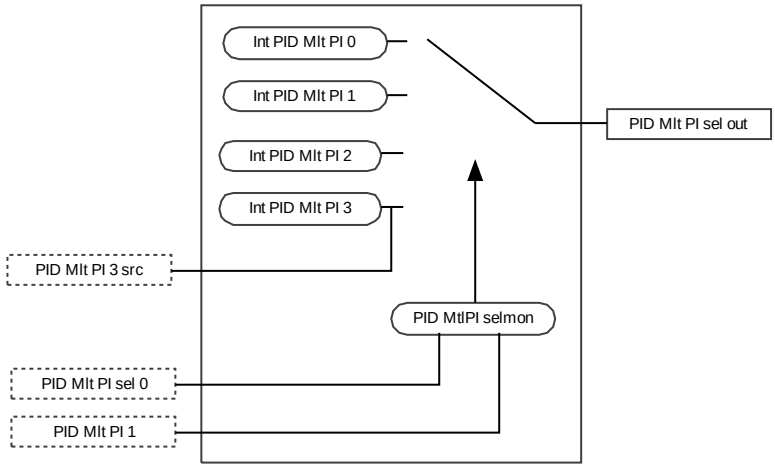
Description:

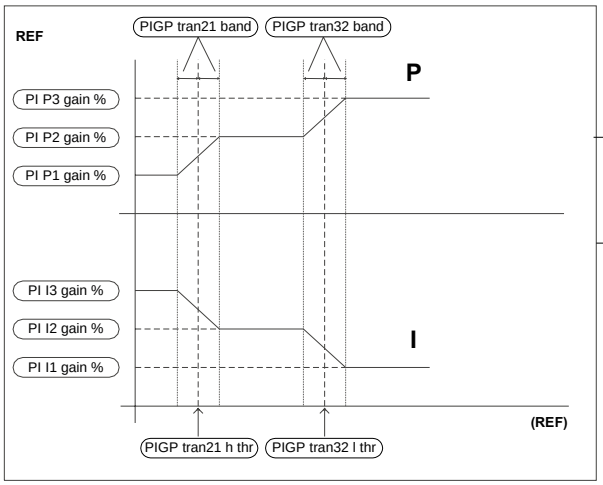
```
APPL FUNCTION    PID
                 PI control
                     PI control src
                         PID PI enab src
                         PID I freeze src
                         PIGP ref src
                         PID Mlt PI sel 0
                         PID Mlt PI sel 1
                         PID Mlt PI 3 src
                     PI control cfg
                         PI steady delay
                         PI steady thr
                         PI P1 gain %
                         PI I1 gain %
                         PI P2 gain %
                         PI I2 gain %
                         PI P3 gain %
                         PI I3 gain %
                         PIGP tran21 hthr
                         PIGP tran32 lthr
                         PIGP tran21 band
                         PIGP tran32 band
                         PI Pinit gain
                         PI Iinit gain
                         PI clamp top
                         PI clamp bot
                         Int PID Mlt PI 1
                         Int PID Mlt PI 2
                         Int PID Mlt PI 3
```

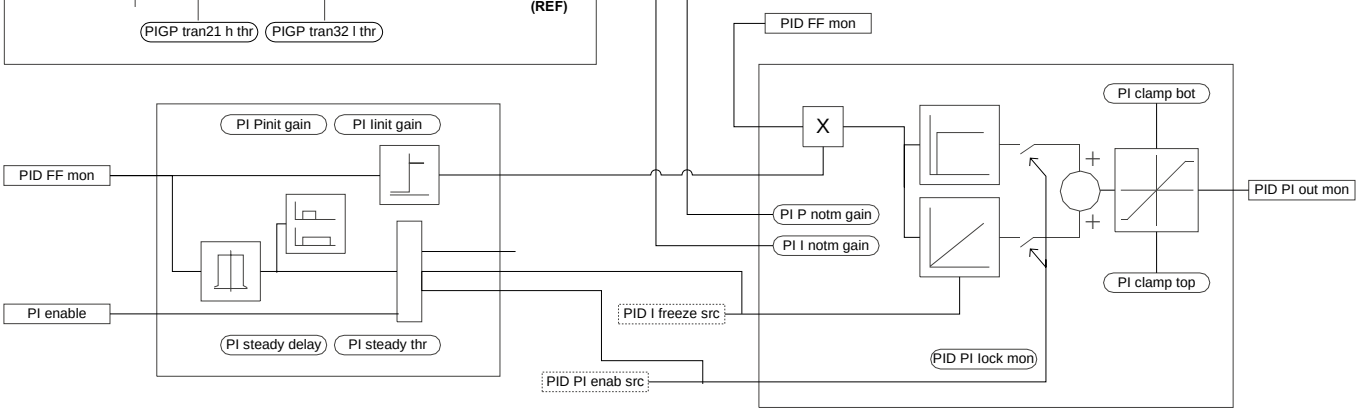
PI control mon
PID PI lock mon
PIGP ref mon
PI Pnorm gain
PI Inorm gain
PID PI out mon
PID Mlt PI 0 mon
PID Mlt PI 3 mon
PID MltPI selmon

APPL FUNCTION SAVE PARAMETERS

The PI Control Block is shown in the figures below







PI control src

PID PI enab src	Source of the PI section enable signal
PID I freeze src	Source of the PI section Freezing signal
PIGP ref src	Source of the gain adaptive signal
PID Mlt PI sel 0	Source of the selector 0 signal of the starting multiplier
PID Mlt PI sel 1	Source of the selector 1 signal of the starting multiplier
PID Mlt PI 3 src	Source of the multiplier 3 signal (ex. diameter sensor)

PI control cfg

PI steady delay	Period of time, during which the *P* and *I init gain* gains are kept active after the *PI steady thr* threshold has been overcome by the *PID FF mon* reference.
PI steady thr	Steady State detecting threshold
PI P1 gain %	PI gain segment 1
PI I1 gain %	.....
PI P2 gain %	PI gain segment 2
PI I2 gain %	.....
PI P3 gain %	PI gain segment 3
PI I3 gain %	.....
PIGP tran21 h thr	Segment transition point from 1 to 2
PIGP tran32 l thr	Segment transition point from 2 to 3
PIGP tran21 band	Width of the transition band from 1 to 2
PIGP tran32 band	Width of the transition band from 2 to 3
PI Pinit gain	P starting gain PI section
PI Iinit gain	I starting gain PI section
PI clamp top	PI upper conversion value
PI clamp bot	PI lower conversion value
Int PID Mlt PI 1	Initialization value of the Multiplier 1
Int PID Mlt PI 2	Initialization value of the Multiplier 2
Int PID Mlt PI 3	Initialization value of the Multiplier 3

PI control mon

PID PI lock mon	Monitor lock PI section
PIGP ref mon	Reference monitor of the gain adaptive
PI Pnorm gain	
PI Inorm gain	
PID PI out mon	Monitor of the PI Block output
PID Mlt PI 0 mon	Monitor of the multiplier 0 value
PID Mlt PI 3 mon	Monitor of the multiplier 3 value
PID MltPI selmon	Monitor of the selected multiplier

1.15.4.1 Setting of the Starting Diameter

By selecting ***PID MltPI sel mon = 0***, when the PI Block is disabled (*PID PI enab* = 0), the last value of the calculated integral component is kept into memory. Such integral component is displayed in *PID PI out mon* (it corresponds to the winder diameter). When the Block is enabled again, the regulation starts from the calculated value. The same function is foreseen also in case the Drive stops.

This operative method can be used, when, by controlling, for example, a winder, it is necessary to stop the machine, to disable the Drive or to disconnect the switchboard.

By selecting ***PID MltPI selmon*** = 1-2-3, when the PI Block is disabled, the value of the **PID PI out mon** output is the same as the one of the set parameter. When the Drive is stopped and then started again, the previously stated value is automatically reset only if , during the power supply, the digital input, set as **Enable PI PID,** is already at a high level.

1.15.4.2 Gain Increase at the Starting

When **PID FF mon** is lower than **PI steady thr,** the integral regulation is frozen and the proportional gain gets the value set in **PI P init gain.**

When **PID FF mon** overcomes the threshold, the integral regulation is enabled with the gain set in **PI I init gain.**

The PI Block keeps the **PI P init gain** and **PI I init gain** gains for the time set via **PI steady delay.** After this time, the gain values are brought respectively to those generated by the gain adaptive.

1.15.4.3 PI Clamp Top and Bottom Setting

As previously stated, **PID PI out mon** is used as a multiplicative factor of the feed-forward in order to obtain the motor angular speed reference; in case the PID function is used to control a winder/unwinder, its value is inversely proportional to the winder diameter.

By winding with a constant peripheral speed, it is possible to write that: $\omega_0\Phi_0=\omega_1\Phi_1$ where:

- ω_0 = **angular speed with a minimum diameter**
- Φ_0 = **minimum diameter**
- ω_1 = **angular speed with the present diameter**
- Φ_1 = **present diameter**

$w_1 = w_0 \times (\Phi_0/\Phi_1)$

By tuning the Drive properly**, ω_0 corresponds to a wrong feed-forward,** therefore **PID PI out mon** depends on **(Φ_0/Φ_1).**

It is possible to write that: PID PI out mon = (Φ_0/Φ_1)

This formula can be used to check the right tuning execution when the system is active or during the procedure for the calculation of the starting diameter.

1.15.5 Proportional Derivative Control (PD Control)

This Block performs the **P**roportional **D**erivative regulation.

The **PD** Block has on the input the **PID Input** value (output value of the PID Input Block), which usually states an error. The output of the Block is added to the other corrections in the PID output Block.

The ***PID PD enab src*** source allows to enable the PD function.

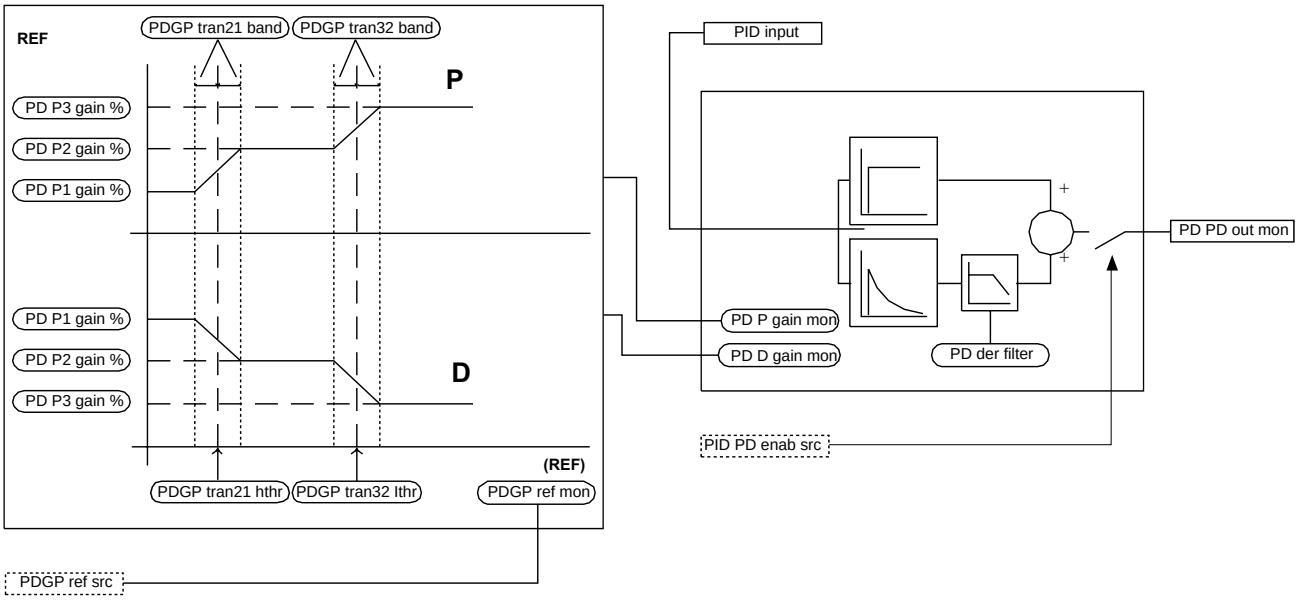
The gains can be adjusted according to the variable selected on the ***PDGP ref src*** source.
The Block allows to set a **Profile** on three segments.

The inputs are: · PID PI enab src
· PID Mtl PI 3 src

Description:

```
APPL FUNCTION    PID
                 PD control
                     PD control src
                         PID PD enab src
                         PDGP ref src
                     PD control cfg
                         PD P1 gain %
                         PD D1 gain %
                         PD P2 gain %
                         PD D2 gain %
                         PD P3 gain %
                         PD D3 gain %
                         PDGP tran21 hthr
                         PDGP tran32 lthr
                         PDGP tran21 band
                         PDGP tran32 band
                         Int PDGP ref
                         PD der filter
                     PD control mon
                         PID PD out mon
                         PD P gain mon
                         PD D gain mon
                         PDGP ref mon
APPL FUNCTION    SAVE PARAMETERS
```

The PD control Block is shown in the figure below.



PD control src	
PID PD enab src	PD section enabling source
PDGP ref src	Gain adaptive source
PD control cfg	
PD P1 gain %	P gain segment 1
PD D1 gain %	D gain segment 1
PD P2 gain %	P gain segment 2
PD D2 gain %	D gain segment 2
PD P3 gain %	P gain segment 3
PD D3 gain %	D gain segment 3
PDGP tran21 hthr	Segment transition point from 1 to 2
PDGP tran32 lthr	Segment transition point from 2 to 3
PDGP tran21 band	Width of the transition band from 1 to 2
PDGP tran32 band	Width of the transition band from 2 to 3
Int PDGP ref	Adaptive signal. Internal value
PD der filter	Derivative filter
PD control mon	
PID PD out mon	Output correction value
PD P gain mon	Monitor for the P gain in use
PD D gain mon	Monitor for the D gain in use
PDGP ref mon	Value of the present adaptive signal

1.15.6 PID Output Block (PID Output)

This Block gathers the following signals:

- Feed forward
- PI block output
- PD block output

As stated before, the FeedForward signal is multiplied by the PI Block output. It is possible to obtain different effects according to this signal configuration.

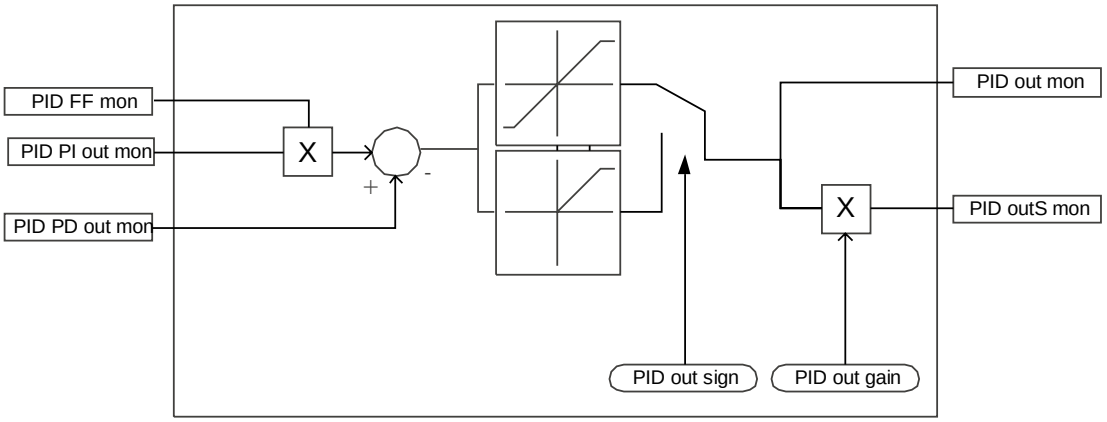
The signal of the PD Block, on the contrary, is subtracted. In the Block configurations it is possible to select the output as **Bipolar or Multipolar** (only for positive values) via an internal selector. On the Block output it is possible to find a direct output, PID out, and an output with a configurable gain, PID outs.

The Block outputs are: · PID out mon
· PID outs mon

Description:

```
APPL FUNCTION     PID
                  PID output
                       PID output cfg
                            PID out sign
                            PID out gain
                       PID output mon
                            PID out mon
                            PID outS mon
APPL FUNCTION     SAVE PARAMETERS
```

The PID Output Block is shown in the figure below.



PID output cfg

PID out sign	Output selection: Monopolar/Bipolar
PID out gain	Scale factor (output gain)

PID output mon

PID out mon	Direct output displaying
PID outS mon	Displaying of an output with a scale factor (gain setting)

1.15.7 Diameter Calculation (Diameter Calc)

This Function allows to perform a preliminary calculation of a coil diameter before starting the line. It allows to avoid undesired mechanical sealings of the dancer.

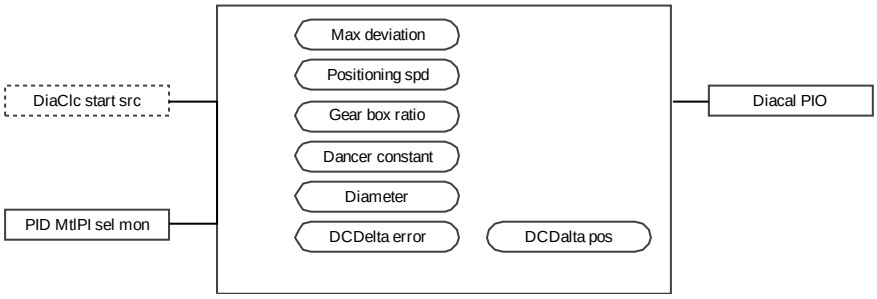
The calculation is based on the moving of the dancer from the lower limit switch position to a central position as compared to the winder angular moving during the initial phase.

The function is only available with a dancer reaction. The calculation result initializes the PI Block output.

Description:

```
APPL FUNCTION    PID
                 Diameter calc
                     Settings
                         Max deviation
                         Positioning spd
                         Gear box ratio
                         Dancer constant
                         Minimum diameter
                         DiaClc start src
                     Start ?
                         Press I key
                     Results
                         Diameter
                         Diacal PIO
                         DCDelta error
                         DCDelta pos
APPL FUNCTION    SAVE PARAMETERS
```

The Diameter Calculation Block is shown in the figure below.



Diameter calc Settings

Max deviation	Position of maximum mechanical sealing for the dancer
Positioning spd	Positioning speed
Gear box ratio	Reduction ratio between motor and winder (<=1)
Dancer constant	Measurement of the total material accumulation
Minimum diameter	Value of the winder minimum diameter
DiaClc start src	Source of the start Diameter Calculation command
Diameter calc Start ?	
Diameter calc Press I key	

Diameter calc Results

Diameter	Calculated diameter
Diacal PIO	PI initialization value
DCDelta error	Dancer movement
DCDelta pos	Winder movement (encoder pulses)

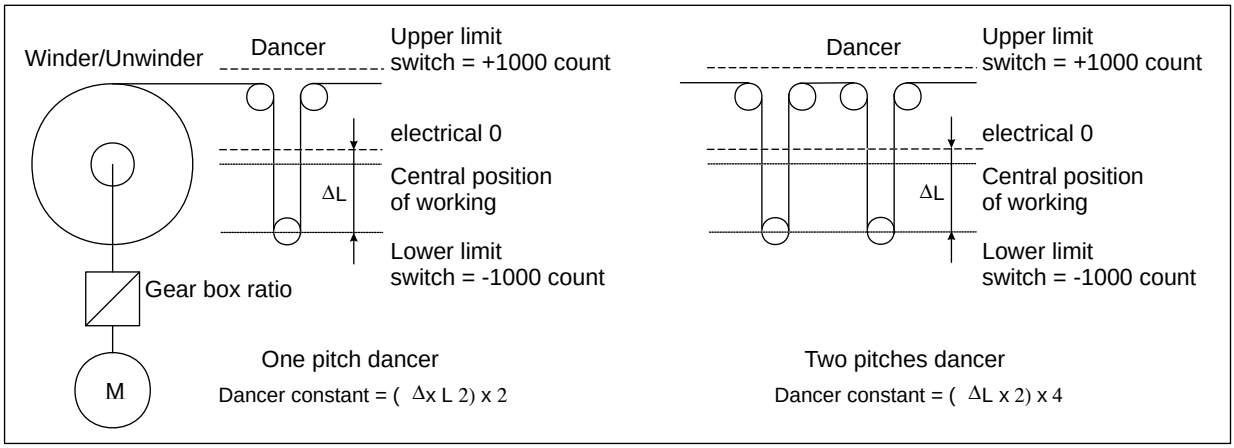


Figure 1.15.7.1: Diameter Calculation

1.15.7.1 Dancer Constant Measurement

With the dancer placed in a lower limit switch position, perform the self-tuning of the analog input connected to **PID fbk src**.

Set the Drive keypad on the **PID fbk mon** parameter.

Measure and multiply by 2 the distance in mm between the lower mechanical limit switch and the dancer position, where the **PID fbk mon** parameter has a 0 value (electric 0 position).

Multiply the calculated value by 2 if the dancer is made of a single pitch, by 4 if it is made of two pitches etc. etc. as per the above figure.

1.15.7.2 Procedure for the Calculation of the Starting Diameter

Such calculation is based on the measurement of the dancer moving from its lower limit switch position to its central working position, and on the measurement of the winder angular moving during the initial phase.

For this reason during such period the dragging at the unwinder end or at the winder beginning must be in a position to keep the material blocked. To this purpose it is necessary to enable the dragging Drive regulation with a speed reference = 0.

If also the line nip rolls are controlled by dancers or loading cells, it is necessary to carry out first the diameter calculation with the following winder and unwinder initial phase and afterwards the dragging initial phase.

The ***PID MlpPI sel*** parameter must always be equal to 0 in order to avoid that ***PID PI out mon*** is set with a predefined value.

By setting the source of ***DiaClc start src*** to one and if the Drive is enabled, the procedure is started.

During this phase the parameters and the PI and PD regulators are disabled.

The regulation checks the signal coming from the dancer potentiometer.

If this value is higher than the one set in ***Max deviation***, the motor starts rotating with the speed reference set in ***Positioning spd*** in order to wind the material on the winder and to bring the dancer into its central working position.

If the regulation checks that the signal coming from the dancer potentiometer is lower than the value set in ***Max deviation***, the motor starts rotating with the speed reference set in ***Positioning spd*** in order to unwind the material and to bring the dancer to the point identified by ***Max deviation***.

At this point the reference is inverted until bringing the dancer in its central working position.

When the dancer has reached its central position, the ***PID PI out*** parameter is initialized with the value of the measured diameter.

The ***Diacalc active*** variable brings to a high logic level the Diameter calc st digital output, stating the end of the diameter calculation phase.

Now, if the PI and/or PD blocks are enabled, the system reaches automatically the regulation mode.

To this purpose the digital inputs programmed as ***DiaClc start*** for the PI and PD enable are brought simultaneously to a high logic level.

The ***Diacalc active*** output signal can be used to reset the ***DiaClc start*** command (such command is activated on the climbing leading edge of the digital input; for this reason it has to be brought to a high level after power supplying the Drive regulation section and it has to be reset when the starting calculation phase is over).

The value of PID PI out is calculated via the following formula:

PID PI out = (Minimum diameter x PI clamp top) / value of the calculated diameter

The ***PI clamp top*** and ***PI clamp bot*** parameters of the PI controls menu have to be set according to the maximum and minimum winder diameter.

1.16 APPLICATIONS EXAMPLES FOR THE PID FUNCTION

1.16.1 Control of Nip Rolls with Dancer

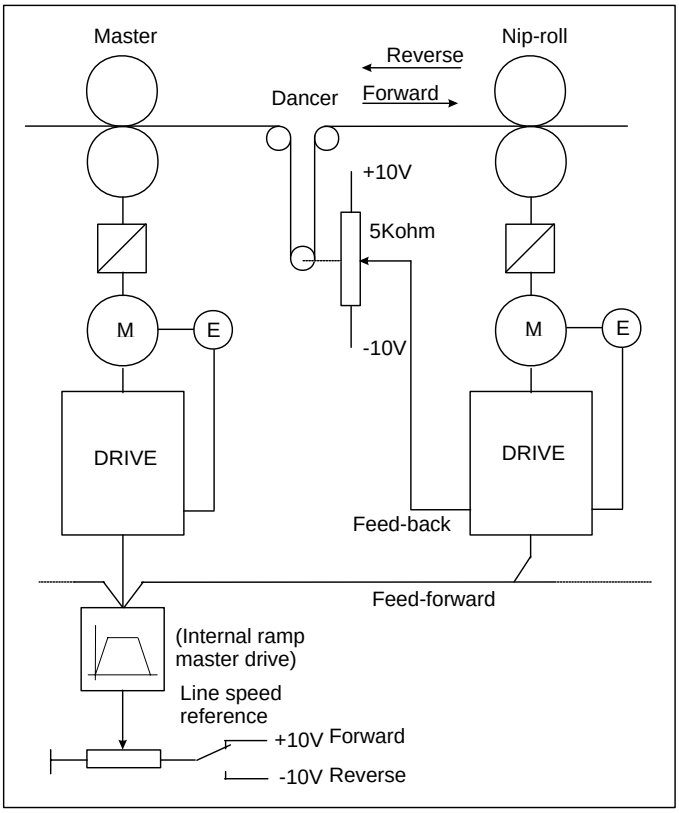


Figure 1.16.1.1: Control of Nip Rolls with Dancer

1.16.1.1 Machine Data

Rated speed of the Slave motor Vn = 3000rpm

Slave motor speed corresponding to the max. line speed = 85% Vn = 2550rpm

Maximum dancer correction = +/- 15% of the line speed = +/- 382.5rpm

The Drive of the Slave nip roll has to receive the analog signals referring to the line speed and to the Dancer position (whose potentiometer will be power supplied at its ends with values included between –10V…+ 10V) and the digital commands referring to the PID control enabling.

The output of the PID regulator is sent to the speed 1 reference.

1.16.1.2 Input/Output

Drive settings: (only those referring to the PID function are described)

Connect to the analog input 1 the dancer cursor.

Select *PID fbk src* = An inp 1 output

Connect to the analog input 2 the line speed reference (feed- forward).

Select *PID inp FF src* = An inp 2 output

Connect to the Digital input 1 the input enabling the PID PI Block
Select PID PI enab src = DI 1 monitor

Connect to the Digital input 2 the input enabling the PID PD Block
Select PID PD enab src = DI 2 monitor

In case just one contact is required to enable the PI and PD section, it is possible to connect also PID PD enab src on the digital input 1 as described below.
Select PID PD enab src = DI 1 monitor

Connect to the speed 1 reference the PID output
Select Speed ref 1 src = PID out mon
Set Ramp out enable = Disable

1.16.1.3 Parameters

Set **Full scale spd** equal to the motor speed corresponding to 100% of the line speed.
Full scale spd = 2550 rpm

Connect
Mlt PI sel 0 = Null
Mlt PI sel 1 = One The selection of the PID Mlt PI sel 1 multiplier is therefore active.

Set
PID Mlt PI sel 1 = 1 The starting value is 1

In case the regulator PI Block has performed no correction, the line speed reference (Feed-Forward) has to be multiplied by 1 and sent directly to the Drive regulator speed.
With this application, the regulator usually carries out a proportional control. The correction is stated as a percentage of the line speed, from 0 to the maximum value.

Set **PI clamp top** and **PI clamp bot** so that, with a maximum mechanical sealing of the dancer (maximum value of the analog input 1 connected to the dancer reaction), and by setting the proportional gain of the PI block to 15%, a corresponding proportional correction of the feed-forward is obtained.
Set therefore:
PI clamp top= 10
PI clamp bot= 0.1

Programmare PI P1 gain % = 15% 1 o 3 vedi errore durante test
Programmare PI I1 gain % = 0%

With such a configuration and having a proportional correction of the line speed, the PI Block can not position the dancer when the machine is stopped. In order to carry out the initial phase when the machine is stopped, it is necessary to act on the PD block.

Set **PD P1 gain %** with a value allowing to position the dancer without big dynamic stresses. For example:
PD P1 gain % = 1%

Use the derivative component as a system "damping" element by setting for example:
PD D1 gain % = 1 %
PD der filter = 20 ms

If it is not needed, leave these parameters = 0.

In case a series of cascade references has to be performed for another possible Drive, set **PID out mon** on an analog output, for example:

An out 1 src = PID out mon

1.16.2 Control of Nip Rolls with Loading Cell

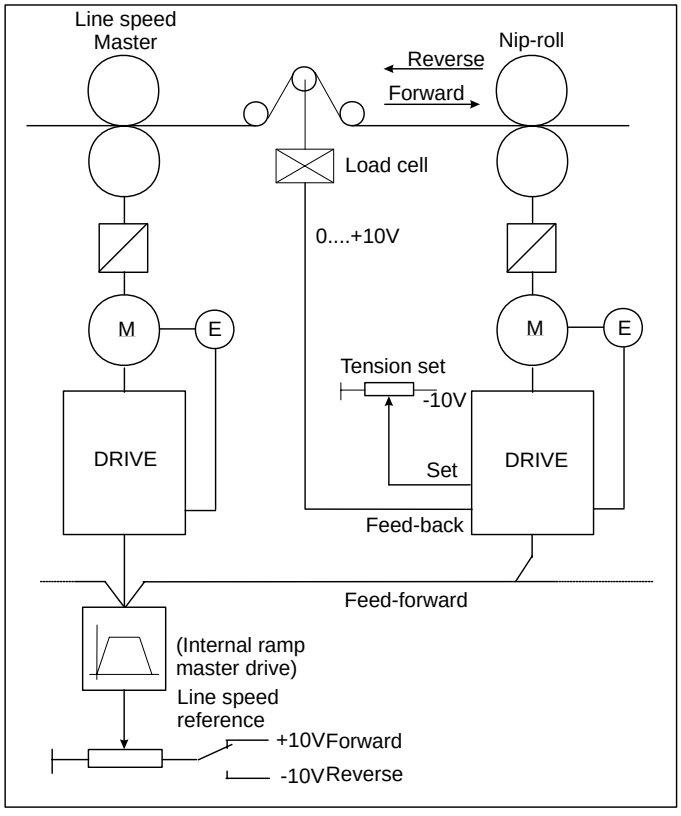


Figure 1.16.2.1: Control of Nip Rolls with Loading Cell

1.16.2.1 Machine Data

Rated speed of the Slave motor Vn = 3000rpm

Slave motor speed corresponding to the max. line speed = 85% Vn = 2550rpm

Maximum correction of the loading cell = +/- 20% of the line speed = +/- 510rpm

The drive of the Slave nip roll must receive the analog signals referring to the line speed, to the loading cell (0....+10V) and to the tension (0....-10V), plus the digital commands referring to the PID control enabling.

The regulator output is sent to the speed 1 reference.

1.16.2.2 Input/Output

Drive settings: (only those referring to the PID function are described)

Connect to the analog input 1 the Dancer cursor.
Select *PID fbk src* = An inp 1 output

Connect to the analog input 2 the line speed reference (feed- forward).
Select *PID inp FF src* = An inp 2 output

Connect to the analog input 3 the tension reference.
Select PID draw src = An inp 3 output

Connect to the Digital input 1 the input enabling the PID PI Block
Select PID PI enab src = DI 1 monitor

Connect to the Digital input 2 the input enabling the PID PD Block
Select PID PD enab src = DI 2 monitor

In case just one contact is needed to enable the PI and PD section, it is possible to connect also PID PD enab src on the digital input 1 as described below.
Select PID PD enab src = DI 1 monitor

Connect to the speed 1 reference the PID output
Select Speed ref 1 src = PID out mon
Set Ramp out enable = Disable

1.16.2.3 Parameters

Set **Full scale spd** equal to the motor speed corresponding to 100% of the line speed.
Full scale spd = 2550 rpm

Connect :
Mlt PI sel 0 = Null
Mlt PI sel 1 = One The selection of the PID Mlt PI sel 1 selector is therefore active

Set:

PID Mlt PI sel 1 = 1 The starting value is 1

Without a correction performed by the regulator PI Block, the line speed reference (Feed-Forward) must be multiplied by 1 and must be sent directly to the Drive speed regulator. The regulator usually carries out a **P**roportional-**I**ntegral control. The correction is stated as a percentage of the line speed, from 0 to the maximum value.

Set **:**

PI lim top and **PI lim bot** in order to obtain a maximum correction of the PI Block equal to 20% of the line speed.

The **PI lim top** and **PI lim bot** parameters can be considered, respectively, as the maximum and minimum multiplicative factor of the feed-forward.

2550rpm of the motor (max. feed-forward) correspond to the max. line speed.

Maximum correction = 2550 x 20% = 510rpm

2550 + 510 = 3060rpm ——> **PI lim top** = 3060 / 2550 = 1.2

2550 - 510 = 2040rpm ——> **PI lim bot** = 2040 / 2550 = 0.80

With such a configuration and with a proportional correction of the line speed, the PI block is not in a position to carry out the initial phase when the machine is stopped; it is therefore necessary to act also on the PD Block.

The gains of the different components have to be set, experimentally, with a loaded machine; such tests can be started with the values stated below (default values):

Set **PI P1 gain %** = 2%

Set **PI I1 gain %** = 2%

Set **PD P1 gain %** = 1%

Use the derivative component as a system "damping" element, by setting for example:

PD D1 gain % = 1%

PD der filter = 20ms

If it is not required, leave these parameters = 0.

In case a series of cascade references has to be performed for another possible Drive, set **PID out mon** on an analog output, for example:

An out 1 src = PID out mon

NOTE! See the "Generic PID" paragraph in case it is necessary to have a system with an integral regulation enabled also with feed-forward = 0 and in a position to carry out the system initial phase without errors even with a stopped machine.

1.16.3 Control of Winders/Unwinders with Dancer

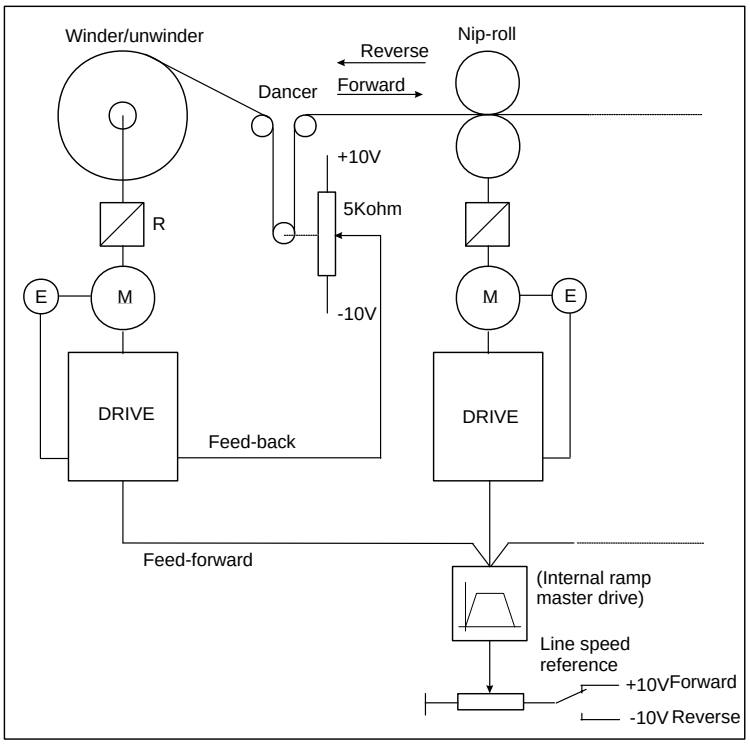


Figura 1.16.3.1: Control of Winders/Unwinders with Dancer

1.16.3.1 Machine Data

Maximum line speed =400m/min

Rated speed of the winder motor Vn = 3000rpm

Winder maximum diameter = 700mm

Winder minimum diameter = 100mm

Motor-winder reduction ratio = 0.5

One-pitch dancer

Dancer stroke from the lower limit switch to the electric 0 position = 160mm

The winder/unwinder Drive must receive the analog signals referring to the line speed and to the dancer position (whose potentiometer is power supplied at its ends with values included between -10... +10V) and the digital commands referring to the PID control enabling.

The regulator output is sent to the speed 1 reference.

1.16.3.2 Input/Output

Drive settings: (only those referring to the PID function are described)

Connect to the analog input 1 the Dancer cursor.

Select *PID fbk src* = An inp 1 output

Connect to the analog input 2 the line speed reference (feed- forward).

Select *PID inp FF src* = An inp 2 output

Connect to the speed 1 reference the PID output
Select Speed ref 1 src = PID out mon
Set Ramp out enable = Disable

Connect to the Digital input 1 the input enabling the PID PI Block
Select PID PI enab src = DI 1 monitor

Connect to the Digital input 2 the input enabling the PID PD Block.
Select PID PD enab src = DI 2 monitor

In case just one contact is needed to enable the PI and PD section, it is possible to connect also PID PD enab src on the digital input 1 as described below.
Select PID PD enab src = DI 1 monitor
Connect to the Digital input 3 the input enabling the diameter calculation Block
Select DiaClc start src = DI 3 monitor
Connect to the digital output 0 the signal stating the end of the diameter calculation
Select DO 0 src = Diacalc active

1.16.3.3 Parameters

Set **Full scale spd** equal to the motor speed corresponding to 100% of the line speed with a minimum winder diameter (core). **Full scale spd** = 2550 rpm

Calculation of the motor speed according to the above stated conditions:
$Vp = \pi \times \Phi min \times \omega \times R$
where:
Vp = winder peripheral speed = line speed
Φmin = winder minimum diameter [m]
ω = motor angular speed [rpm]
R = motor-winder reduction ratio

$w = Vp / p \times \Phi min \times R = 400 / (\pi \times 0.1 \times 0.5) = 2546rpm =$ <u>about 2550rpm</u>
Connect
Mlt PI sel 0 = Null
Mlt PI sel 1 = Null

With this configuration it is possible to carry out, via a suitable procedure, the calculation of the starting diameter. Furthermore the last calculated diameter value is kept into memory both if the machine is stopped and if the switchboard is switched off.
As previously stated, the procedure determines the theoretic multiplicative factor (**PI output PID**) of the feed-forward as compared to the calculated diameter, in order to send to the Drive the right value of the angular speed.

NOTE! When **PID MltPI selmon = 0** and the PI Block is disabled, the system keeps into memory the last calculated value of **PID out mon.** In case the machine is switched off, such value is automatically reset. In case the value of this parameter has to be set in order to have on the output a wrong reference equal to the feed-forward, it is possible to configure a digital input as a correction reset.

It is therefore necessary to:

select	Mlt PI sel 0	=	DI 4 monitor
set	PID Mlt PI sel 1	=	1

By bringing the digital input to a high logic level, the value of **PID out mon** is set at 1.

Set **PI lim top** and **PI lim bot** according to the winder diameter ratio.

The **PI lim top** and **PI lim bot** parameters can be considered, respectively, as a maximum and minimum multiplicative factor of the feed-forward.

Considering that the motor angular speed, and therefore the reference, are inversely proportional to the winding/unwinding diameter, set:

PI lim top = 1

PI lim bot = Fmin / Fmax = 100 / 700 = 0.14

Here following is a description of the above statements.

Calculation of the motor angular speed:

ω max. = Vl / (Φ x Fmin x R)

e

ω min = Vl / (Φ x Fmax. x R)

where:

ω max. = motor angular speed with a minimum diameter [rpm]

ω min = motor angular speed with a maximum diameter [rpm]

Vl = line speed

Φmin = winder minimum diameter [m]

Φmax. = winder maximum diameter [m]

R = motor-winder reduction ratio

Therefore: ω max. / ω min = Φmax. / Φmin

where

ω min = (Φmin / Φmax) x ω max.

Consider that the **PI lim top** and **PI lim bot** parameters can be considered, respectively, as a maximum and minimum multiplicative factor of the feed-forward.

Multiply the feed-forward by **PI lim top** = 1, the result is the maximum speed reference referring to the minimum diameter.

Multiply the feed-forward by **PI lim bot** = 0.14, the result is the minimum speed reference referring to the maximum diameter.

Such application requires a proportional-integral regulation on the side of the system.

The gains of the different components have to be set, experimentally, with a loaded machine; such tests can be started with the values stated below:

Set **PI P1 gain %** = 2%

Set **PI I1 gain %** = 2%

Set **PD P1 gain %** = 1%

Use the derivative component as a system "damping" element, by setting for example:

PD D1 gain % = 1%

PD der filter = 20ms

In case a series of cascade references has to be performed for another possible Drive, set **PID out mon** on an analog output, for example:

An out 1 src = PID out mon

1.16.4 Parameters Referring to the Function for the Calculation of the Starting Diameter

This function is always necessary when an unwinder has to be controlled or when the starting diameter is unknown.

Set **Positioning spd** with the rpm value required to perform the dancer starting positioning.

For example:

Positioning spd = 15rpm

The polarity of the reference assigned to **Positioning speed** is equal (both with a winder or unwinder) to the one functioning as a winder. If for example an unwinder has to be controlled and the functioning speed reference is positive, set **Positioning spd** with a negative value.

Set **Max deviation** with a value slightly lower than the one corresponding to the position of the maximum mechanical sealing allowed by the dancer.

During the commissioning it is always necessary to perform the self-tuning of the drive analog inputs; in particular by self-tuning the analog input 1 with a dancer in a lower limit switch position, this position is automatically set with a 100% value. Therefore, in order to grant a precise calculation, the value to be set is:

Max deviation = 90 %

Set **Gear box ratio** equal to the reduction ratio between the motor and the winder:

Gear box ratio = 0.5

Set **Dancer constant** with a value in mm corresponding to the total accumulation of the material in the Dancer:

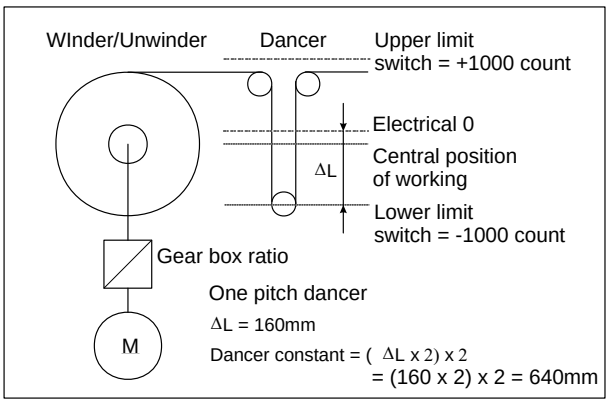


Figure 1.16.4.1: Outlining of the Dancer Constant Measurement

Dancer constant measurement:

Set the Drive keypad on the **PID feed-back** parameter.

Measure and multiply by 2 the distance in mm between the lower mechanical limit switch and the Dancer position so that the value 0 (electric 0 position) is displayed on the **PID feed-back** parameter. Being that the Dancer is made of a single pitch**,** multiply by 2 the above calculated value.

In our case set:

Dancer constant = 640mm

Set **Minimum diameter** equal to the value of the winder minimum diameter [cm]:

Minimum diameter = 10cm

1.16.5 Use of the Diameter Sensor

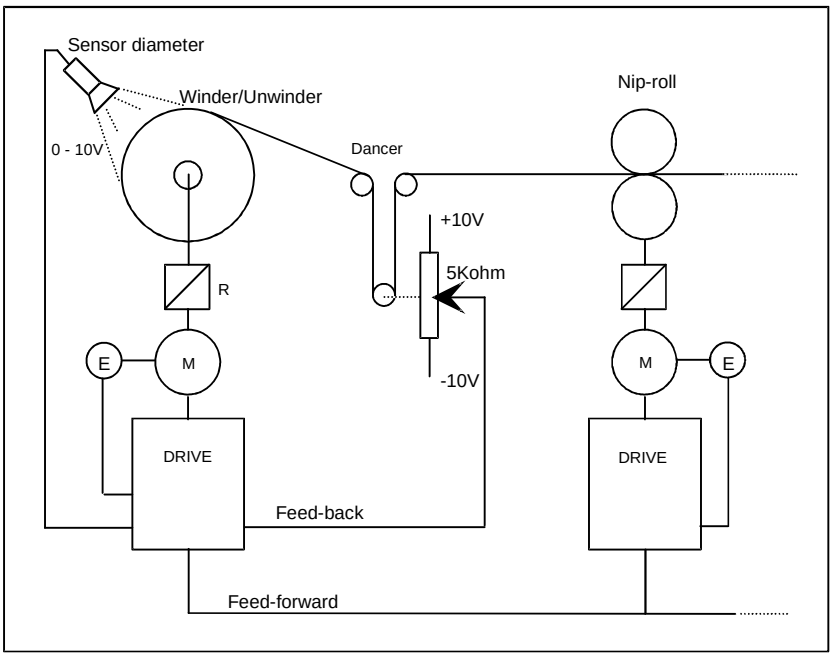


Figure 1.16.5.1: Winder/Unwinder Control with Diameter Sensor

The diameter sensor can be used in case of systems with automatic changing unwinders. In such conditions it is necessary to know the value of the starting diameter in order to calculate the reference of the motor angular speed before carrying out the coil new winding procedure.

The transducer has to be set in order to supply a voltage signal proportional to the winder diameter.

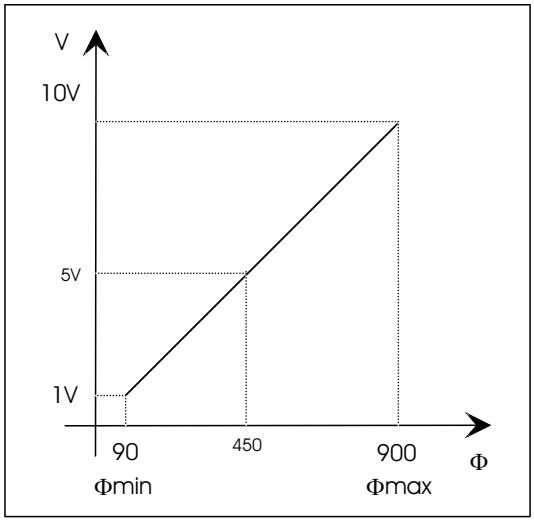


Figure 1.16.5.2: Relationship Between the Transducer Signal and the Winder Diameter

Example:

Φmin	=	90 mm	transducer output	=	1V
Φmax	=	900 mm	transducer output	=	10V
Φ	=	450 mm	transducer output	=	5V

The analog input, which the sensor is connected to, has to be set as a source of **PID Mlt PI 3 src**.
The multiplier selector must point to 3, that is:

Mlt PI sel 0 = One
Mlt PI sel 1 = One The selection of the PID Mlt PI sel 3 multiplier is therefore active.

When **PID PI enab** = disable, the value of **PID Mlt PI 3** is written in **PID PI out mon** and used as a multiplicative factor of the feed-forward.

As already stated, the setting of **PI output PID** depends on the diameter ratio, therefore the proportional voltage signal towards the diameter is automatically calculated again via the formula:

PID Mlt PI 3 = (Φ_0 / Φ_1)

where: Φ_0 = winder minimum diameter
Φ_1 = winder present diameter

NOTE! During the commissioning, it is necessary to check that the signal coming from the sensor is proportional to the diameter and that 10V corresponds to its maximum value.
(the analog input self-tuning has to be performed anyway).

Check also that **PI clam top** and **PI clamp bot** have been programmed according to the diameter ratio as stated in the previous examples.

1.16.6 Pressure Control for Pumps and Extruders

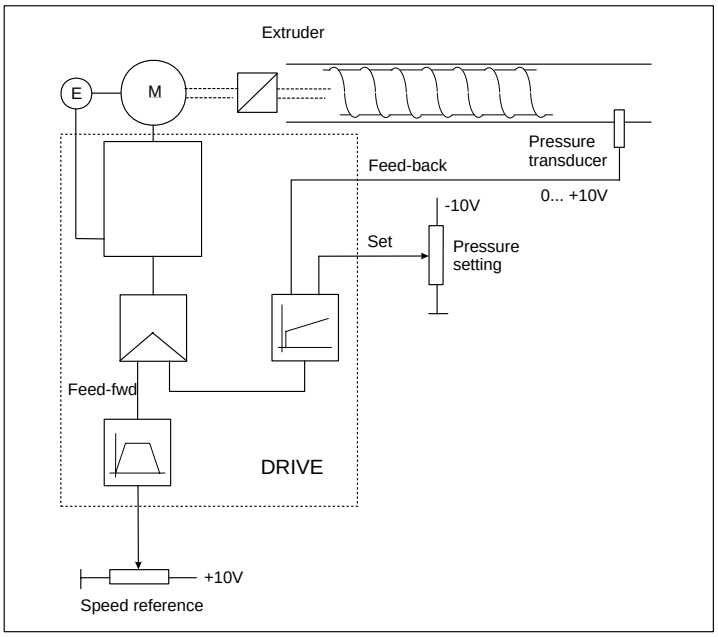


Figure 1.16.6.1: Pressure Control for Pumps and Extruders

1.16.6.1 Machine Data

Rated speed of the extruder motor Vn = 3000rpm

Pressure transducer 0... +10V

The Drive of the Slave extruder must receive the analog signals referring to the speed reference, to the pressure transducer and to the potentiometer for the pressure setting (power supplied at its ends with values included between 0V... -10V) and the digital signals referring to the PID control enabling.

The regulator output is sent to the speed 1 reference.

1.16.6.2 Input/Output

Drive settings: (only those referring to the PID function are described)

Connect to the analog input 1 the pressure transducer.

Select *PID fbk src* = An inp 1 output

Connect to the analog input 2 the signal for the ramp stage. The output of the ramp stage has to be used as a speed reference (feed- forward).

Select *Ramp ref 1 src* = An inp 2 output

Connect as feed- forward the ramp output.

Select *PID inp FF src* = Ramp out mon

Connect to the speed reference 1 the PID output
Select Speed ref 1 src = PID out mon
Set Ramp out enable = Disable

Connect to the analog input 3 the tension reference.
Select PID draw src = An inp 3 output

Connect to the Digital input 1 the input enabling the PID PI Block
Select PID PI enab src = DI 1 monitor

Connect to the Digital input 2 the input enabling the PID PD Block
Select PID PD enab src = DI 2 monitor

In case just one contact is needed to enable the PI and PD section, it is possible to connect also PID PD enab src on the digital input 1 as described below.
Select PID PD enab src = DI 1 monitor

1.16.6.3 Parameters

Set **Full scale spd** equal to the motor maximum speed.
Full scale spd = 3000 rpm

Connect
Mlt PI sel 0 = Null
Mlt PI sel 1 = One The selection of the PID Mlt PI sel 1 multiplier is therefore active.

Set
PID Mlt PI sel 1 = 1 The starting value is 1

Without any correction on the side of the regulator PI Block, the reference of the line speed (Feed-forward) has to be multiplied by 1 and sent directly to the Drive speed regulator.
Set **PI lim top** and **PI lim bot** in order to obtain a maximum correction of the PI Block equal to 100% of the line speed.
The **PI lim top** and **PI lim bot** parameters can be considered, respectively, as a maximum and minimum multiplicative factor of the feed-forward.

PI lim top = 1
PI lim bot = 0

With this application the regulator carries out a proportional-integral control.
The gains of the different components have to be set, experimentally, with a loaded machine; such tests can be started with the values below (default values):
Set **PI P1 gain %** = 4%
Set **PI I1 gain %** = 4%
Set **PD P1 gain %** = 1%

Use the derivative component as a system “damping” element, by setting for example:

PD D1 gain % = 1%

PD der filter = 20ms

If it is not required, leave the parameters = 0.

1.16.7 Generic PID

Drive settings: (only those referring to the PID function are described)
Connect to the analog input 1 the reaction signal.
Select *PID fbk src* = An inp 1 output

Connect to the analog input 2 the reference.
Select *PID draw src* = An inp 2 output

Connect the feed forward signal to its internal reference.
Select *PID inp FF src* = Int PID inp FF
Set *Int PID inp FF* to 100%

Connect to the Digital input 1 the input enabling the PID PI Block
Select PID PI enab src = DI 1 monitor

Connect to the Digital input 2 the input enabling the PID PD Block
Select PID PD enab src = DI 2 monitor

In case just one contact is needed to enable the PI and PD section, it is possible to connect also PID PD enab src on the digital input 1 as described below.
Select PID PD enab src = DI 1 monitor

Connect to the control variable (Torque, Speed, etc.) the PID output

Select xxxxxxxx src (***Torque ref 1 src***, ***Speed ref 1 src***, etc.) = PID out s mon; the scale factor of PID out s mon can be set via the PID Out gain parameter according to the different needs. See chapter 1.1.3, “Normalizations signals”.

1.16.7.1 Parameters

Set **Full scale spd** equal to the motor speed corresponding to 100% of the line speed.

Full scale spd = 2550 rpm

Connect

Mlt PI sel 0 = Null

Mlt PI sel 1 = One The selection of the PID Mlt PI sel 1 multiplier is therefore active.

Set PID Mlt PI sel 1 = 1 The starting value is 1

Set **PI lim top** e **PI lim bot** in order to obtain a maximum correction of the PI Block equal to +/- 100% of the control variable.

The **PI lim top** and **PI lim bot** parameters can be considered, respectively, as a maximum and minimum multiplicative factor of the feed-forward.

PI lim top = 1

PI lim bot = -1

1.16.8 Application Note: Dynamic Change of the PI Block Integral Gain

The higher the diameter ratio of the controlled winder, the lower the value at which the PID integral gain is usually set. A too high value allows a good regulation with low diameters but causes strong system coggings when higher diameters are present.

On the contrary, too low values of the integral gain could cause, with a minimum diameter, a movement of the dancer position, as compared to the electric 0 position, directly proportional to the line speed. It happens because the integral component charge or discharge is performed in a period of time shorter than the diameter changing time.

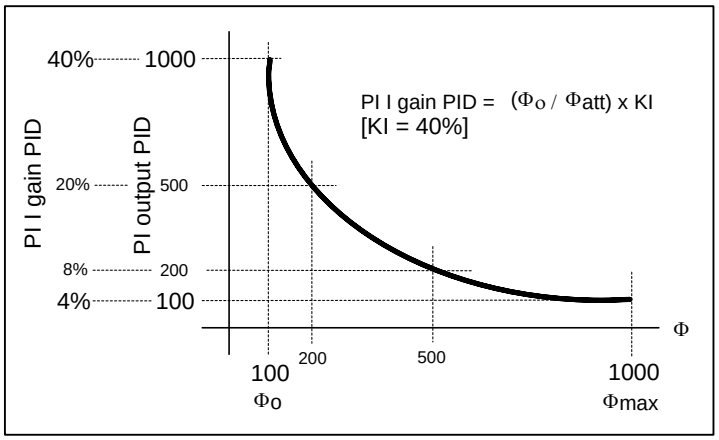


Figure 1.16.8.1: Example with a Small and Big Diameter

In case of high diameter ratios, it could be necessary to change dynamically the values of the PI P and I parameters according to the present diameter.

As the output of the PI Block is inversely proportional to the diameter, it must be connected as the abscissa of the PI gain adaptive.

PIGP ref src = PID PI out mon

The thresholds and gains have to be set in order to obtain a gain Profile equal to the one shown in the following figure.

Consider to control a winder with a 1/10 diameter ratio.

The regulator integral component must be inversely proportional to the diameter.

The value of the **PI output PID** parameter is already in compliance with this rule, as it changes according to the ratio ϕ_0 / ϕ_{att}.

Where: ϕ_0 = winder minimum diameter

ϕ_{att} = winder present diameter

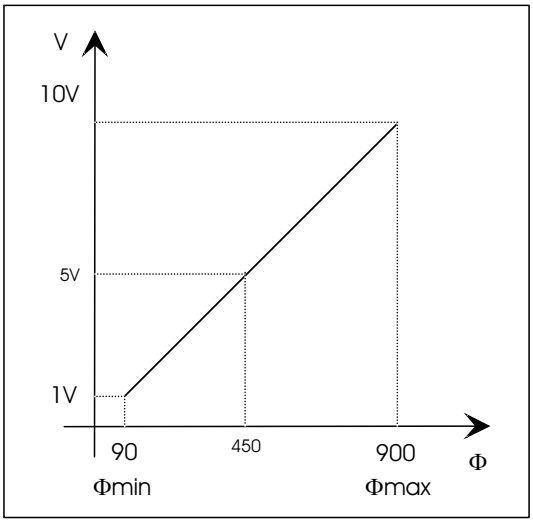


Figure 1.16.8.2: PI I Gain PID and PI I Output PID ratio

1.17 CUSTOMER FUNCTIONS (CUSTOM FUNCTIONS)

1.17.1 Signal Comparator (Compare)

The Block supplies two signal Comparators, **Compare 1 and Compare 2**, with the same features.

Each Comparator is in a position to compare two or three input signals (**INP0**, **INP1**, **INP2**).

They both have 3 sources, ***Cmp x inp 0 src - Cmp x inp 1 src - Cmp x inp 2 src***, through which it is possible to select, on the input, the origin of the signals to be compared (" *x* " stays for 1 or 2).

Each source is standard connected to an **internal variable**, *Cmp x inp* 0 - Cmp *x inp* 1 - Cmp *x inp 2*, which can be set with a count value in the configurations, where, through *Cmp x function* it is possible to select the comparison to be performed.

Some comparisons allow to set via *Cmp x window* a **window**, in count, stating an acceptable range among the signals.

Example:

_INP0 and INP1 have to be compared as "INP0 = INP1"

INP0 = +1000count

INP1 = +1000count

Window = 100count

_in this case the equality is true for a maximum overall variation of INP1 between 1100 and 900 counts.

Possible variations:

None	none
I0 **==** I1	INP0-window ≤ INP1 ≤ INP0+window
I0 **!=** I1	INP1 lower INP0-window, or, INP1 higher INP0+window
I0 **<** I1	INP0 lower INP1
I0 **>** I1	INP0 higher INP1
I0 **<** I1 **>** I2	INP0<INP1<INP2 (INP1 included between..)
|I0| **==** |I1|	|INP0| -window £ |INP1| £ |INP0| +window
|I0| **!=** |I1|	|INP1| lower |INP0| -window, or |INP1| higher |INP0| +window
|I0| **<** |I1|	|INP0| lower |INP1|
|I0| **>** |I1|	|INP0| higher |INP1|
|I0| **<** |I1| **<** |I2|	|INP0| < |INP1| < |INP2| (|INP1|

TAV3i013

|INP|x : signal module.

In the configurations it is also possible to set:

with *Cmp x delay* a **delay** in seconds on the comparison transition;

with *Cmp x inversion* **an inversion** of the signal state.

The monitor function displays via **Compare x output** the state of the chosen function:

_if Compare function is TRUE the output is **1**

_if Compare function is FALSE the output is **0**

Description:

```
CUSTOM FUNCTIONS Compare
        Compare 1
            Compare 1 src
                Cmp 1 inp 0 src
                Cmp 1 inp 1 src
                Cmp 1 inp 2 src
            Compare 1 cfg
                Cmp 1 inp 0
                Cmp 1 inp 1
                Cmp 1 inp 2
                Cmp 1 function
                Cmp 1 window
                Cmp 1 delay
                Cmp 1 inversion
            Compare 1 mon
                Compare 1 output
        Compare 2
            Compare 2 src
                Cmp 2 inp 0 src
                Cmp 2 inp 1 src
                Cmp 2 inp 2 src
            Compare 2 cfg
                Cmp 2 inp 0
                Cmp 2 inp 1
                Cmp 2 inp 2
                Cmp 2 function
                Cmp 2 window
                Cmp 2 delay
                Cmp 2 inversion
            Compare 2 mon
                Compare 2 output
CUSTOM FUNCTIONS SAVE PARAMETERS
```

1.17.2 Use Variables (Pad Parameters)

The use variables, "**Pads**", are used for the data exchange with the option cards.

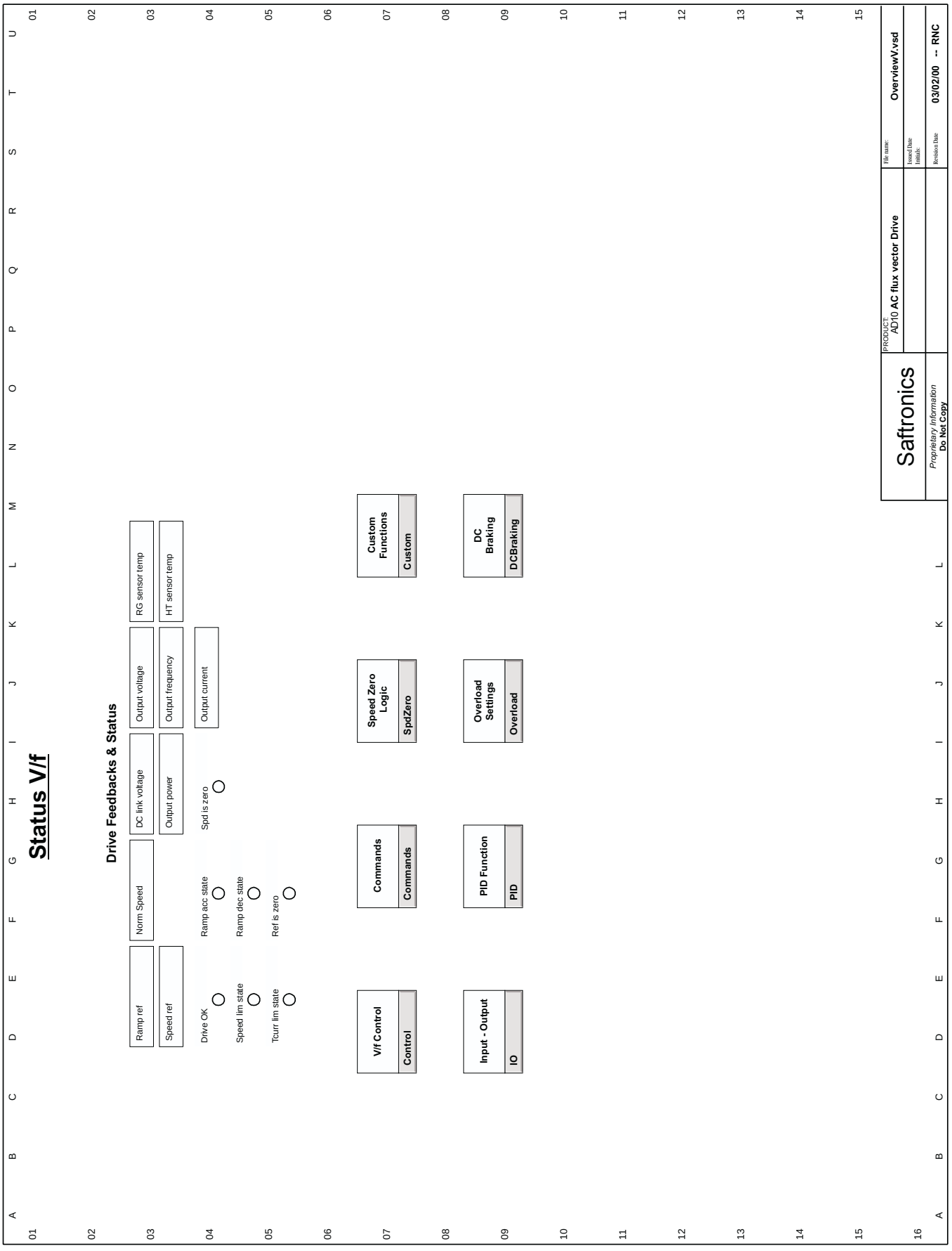
Description:

```
    CUSTOM FUNCTIONS Pad parameters
                     Pad param word
                          Pad 0
                          Pad 1
                          Pad 2
                          Pad 3
                          Pad 4
                          Pad 5
                          Pad 6
                          Pad 7
                          Pad 8
                          Pad 9
                          Pad 10
                          Pad 11
                          Pad 12
                          Pad 13
                          Pad 14
                          Pad 15
                     Pad param bit
                          Dig pad 0
                          Dig pad 1
                          Dig pad 2
                          Dig pad 3
                          Dig pad 4
                          Dig pad 5
                          Dig pad 6
                          Dig pad 7
                          Dig pad 8
                          Dig pad 9
                          Dig pad 10
                          Dig pad 11
                          Dig pad 12
                          Dig pad 13
                          Dig pad 14
                          Dig pad 15

    CUSTOM FUNCTIONS SAVE PARAMETERS
```

Pad 0	analog pad, to be set in count
.....	.....
Pad 15	analog pad, to be set in count
Dig pad 0	digital pad
.....	.....
Dig pad 15	digital pad

Chapter 2 - BLOCK DIAGRAMS



Status Field Oriented Control

Drive Feedbacks & Status

Ramp ref	Norm Speed	DC link voltage	Output voltage	RG sensor temp
Speed ref	Torque ref	Output power	Output frequency	HT sensor temp

Drive OK ○	Ramp acc state ○	Spd is zero ○	Output current
Speed lim state ○	Ramp dec state ○	Std enc fail ○	Flux
Tcurr lim state ○	Ref is zero ○	Exp enc fail ○	

FOC Control	**Commands**	**Speed Zero Logic**	**Custom Functions**
Control	**Commands**	**SpdZero**	**Custom**
Input - Output	**PID Function**	**Overload Settings**	**DC Braking**
IO	**PID**	**Overload**	**DCBraking**

Saftronics	PRODUCT: AD10 **AC flux vector Drive**	File name: **OverviewF.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date

Status Sensorless

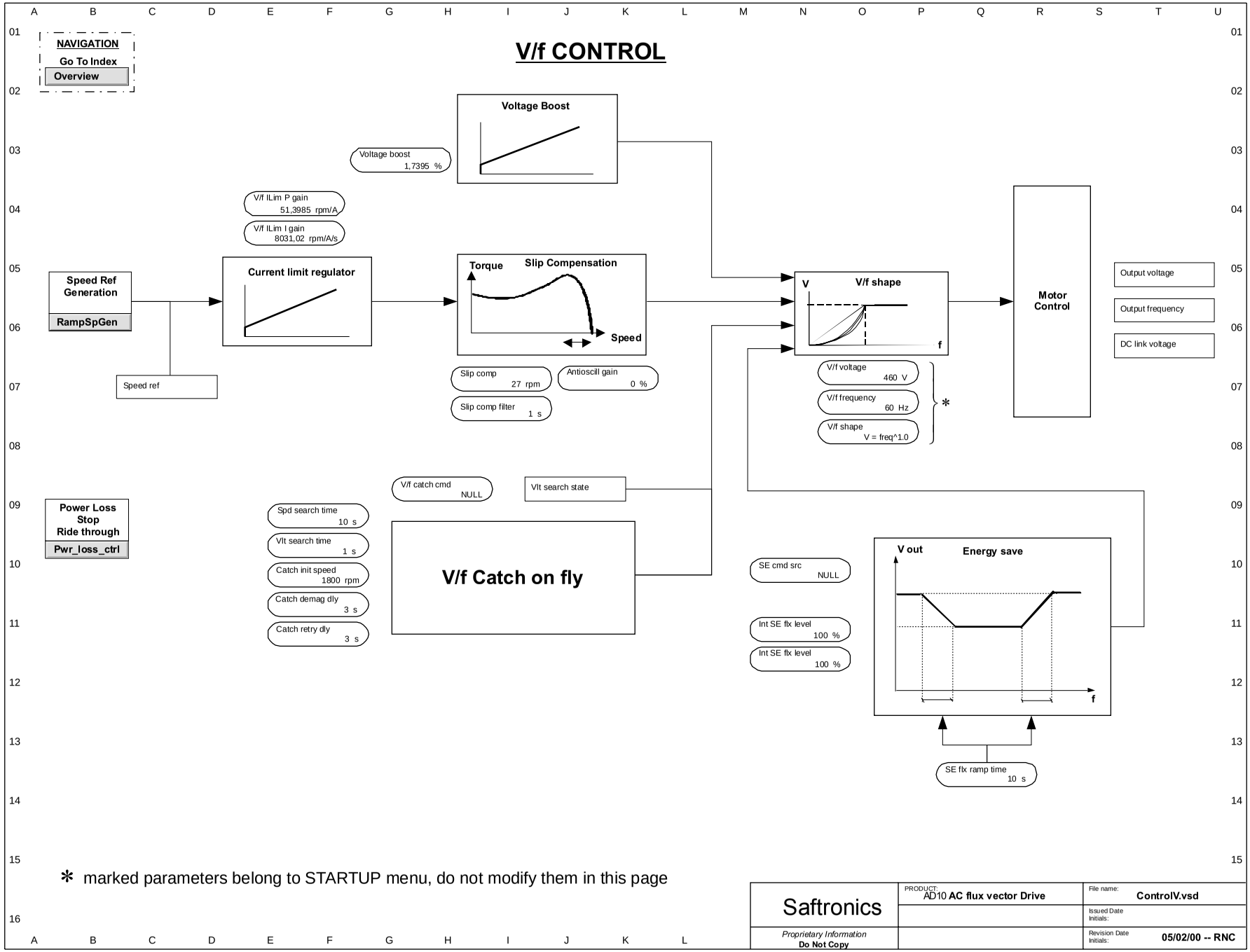
Drive Feedbacks & Status

Ramp ref	Norm Speed	DC link voltage	Output voltage	RG sensor temp
Speed ref	Torque ref	Output power	Output frequency	HT sensor temp

Drive OK ○	Ramp acc state ○	Spd is zero ○	Output current
Speed lim state ○	Ramp dec state ○		Flux
Tcurr lim state ○	Ref is zero ○		

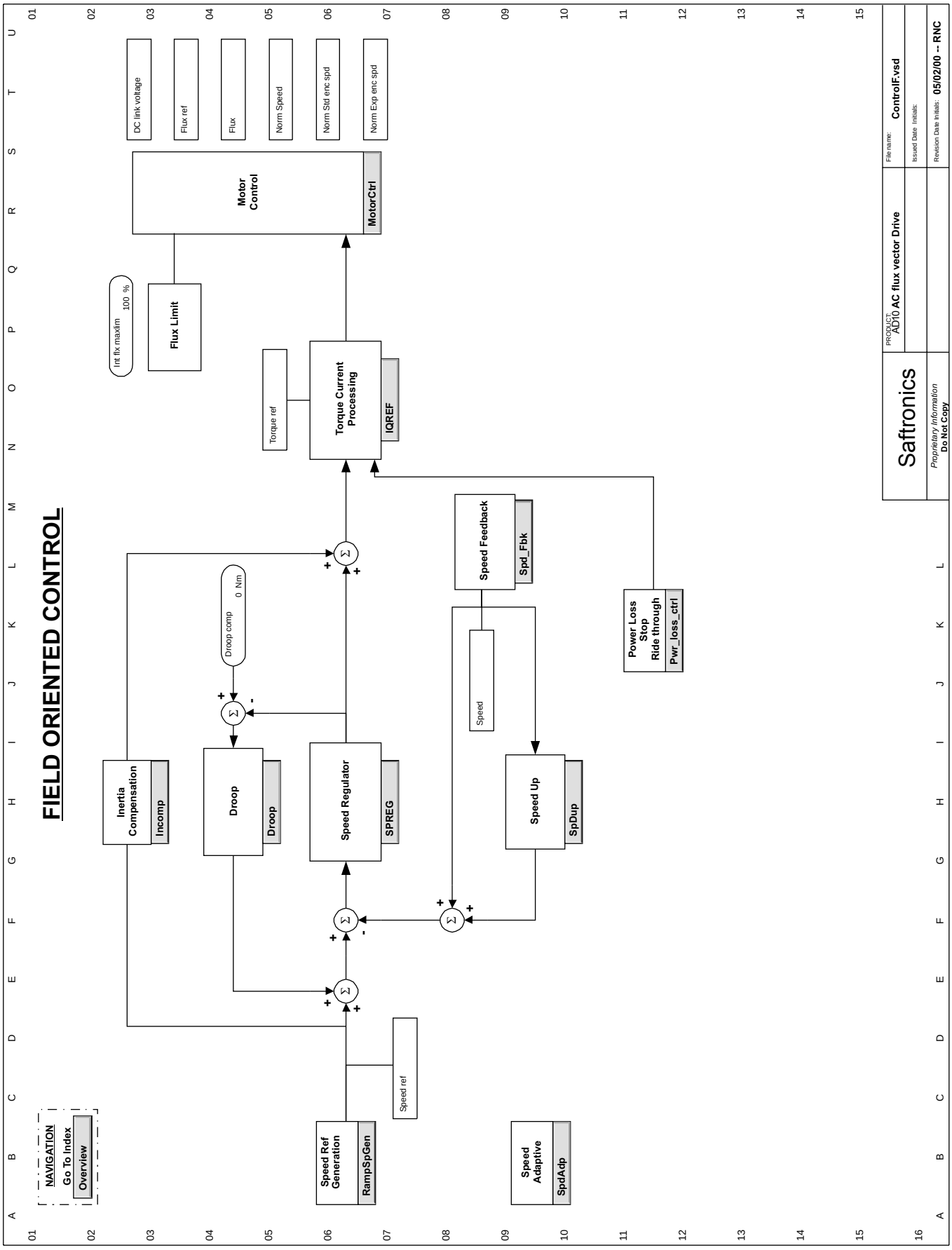
SLS Control	**Commands**	**Speed Zero Logic**	**Custom Functions**
Control	Commands	SpdZero	Custom
Input - Output	**PID Function**	**Overload Settings**	**DC Braking**
IO	PID	Overload	DCBraking

Saftronics	PRODUCT: AD10 **AC flux vector Drive**	File name: **OverviewS.vsd**
		Issued Date Initials: **10/15/99 -- RM**
Proprietary Information **Do Not Copy**		Revision Date **03/02/00 – RNC**



* marked parameters belong to STARTUP menu, do not modify them in this page

Saftronics	PRODUCT: AD10 **AC flux vector Drive**	File name: **ControlV.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: **05/02/00 -- RNC**


FIELD ORIENTED CONTROL
NAVIGATION
Go To Index
Overview
DC link voltage
Flux ref
Flux
Norm Speed
Norm Std enc spd
Norm Exp enc spd
Motor Control
MotorCtrl
Int flx maxlim 100 %
Flux Limit
Torque ref
Torque Current Processing
IQREF
Speed Feedback
Spd_Fbk
Droop comp 0 Nm
Inertia Compensation
Incomp
Droop
Droop
Speed Regulator
SPREG
Speed
Speed Up
SpDup
Power Loss Stop Ride through
Pwr_loss_ctrl
Speed ref
Speed Ref Generation
RampSpGen
Speed Adaptive
SpdAdp
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: ControlF.vsd
Issued Date Initials:
Revision Date Initials: 05/02/00 -- RNC
Proprietary Information
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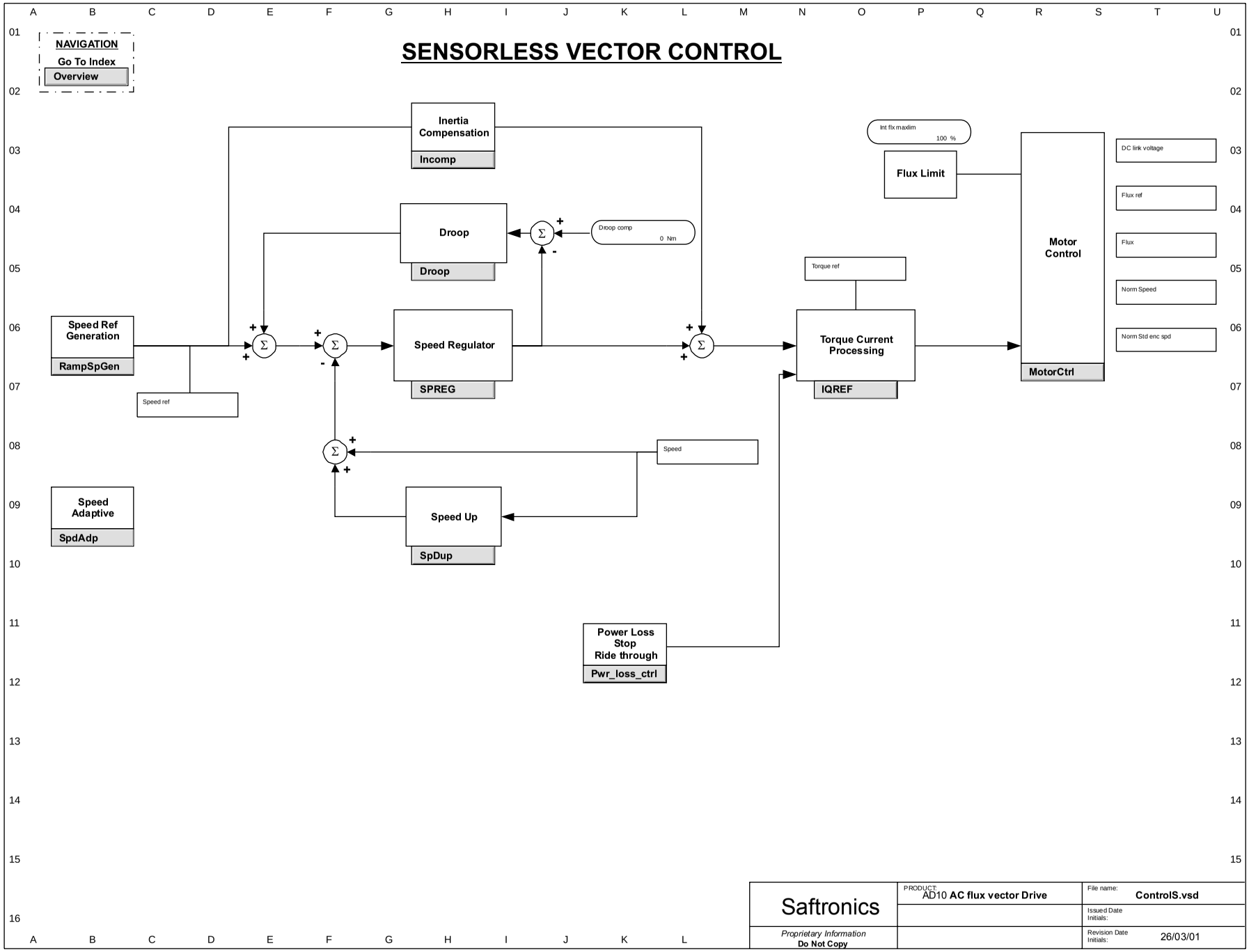
SENSORLESS VECTOR CONTROL
NAVIGATION
Go To Index
Overview
Inertia Compensation
Incomp
Droop
Droop
Droop comp
0 Nm
Int flx maxlim
100 %
Flux Limit
Motor Control
DC link voltage
Flux ref
Flux
Norm Speed
Norm Std enc spd
MotorCtrl
Torque ref
Speed Ref Generation
RampSpGen
Speed ref
Speed Regulator
SPREG
Torque Current Processing
IQREF
Speed
Speed Adaptive
SpdAdp
Speed Up
SpDup
Power Loss Stop Ride through
Pwr_loss_ctrl
Saftronics
Proprietary Information
Do Not Copy
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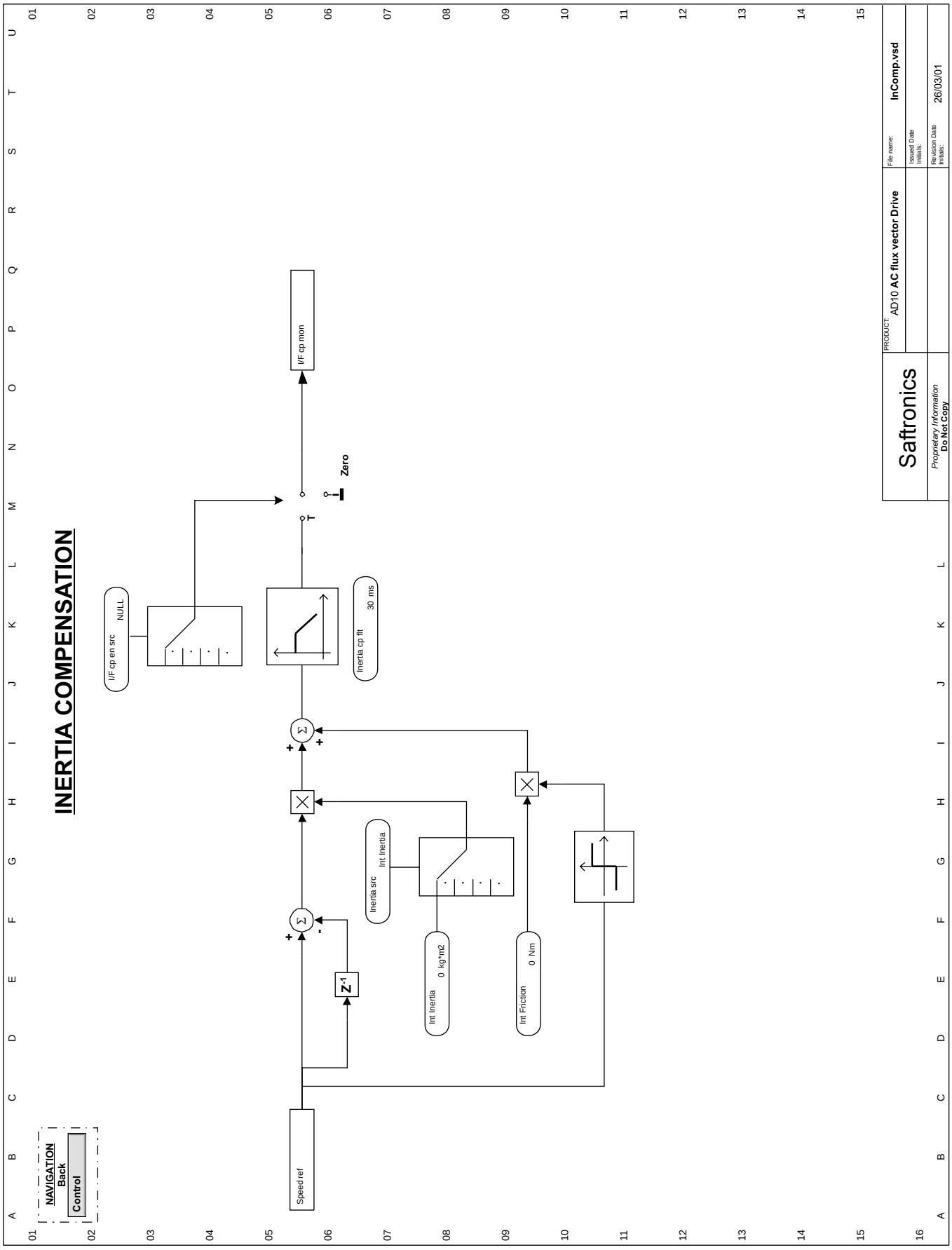
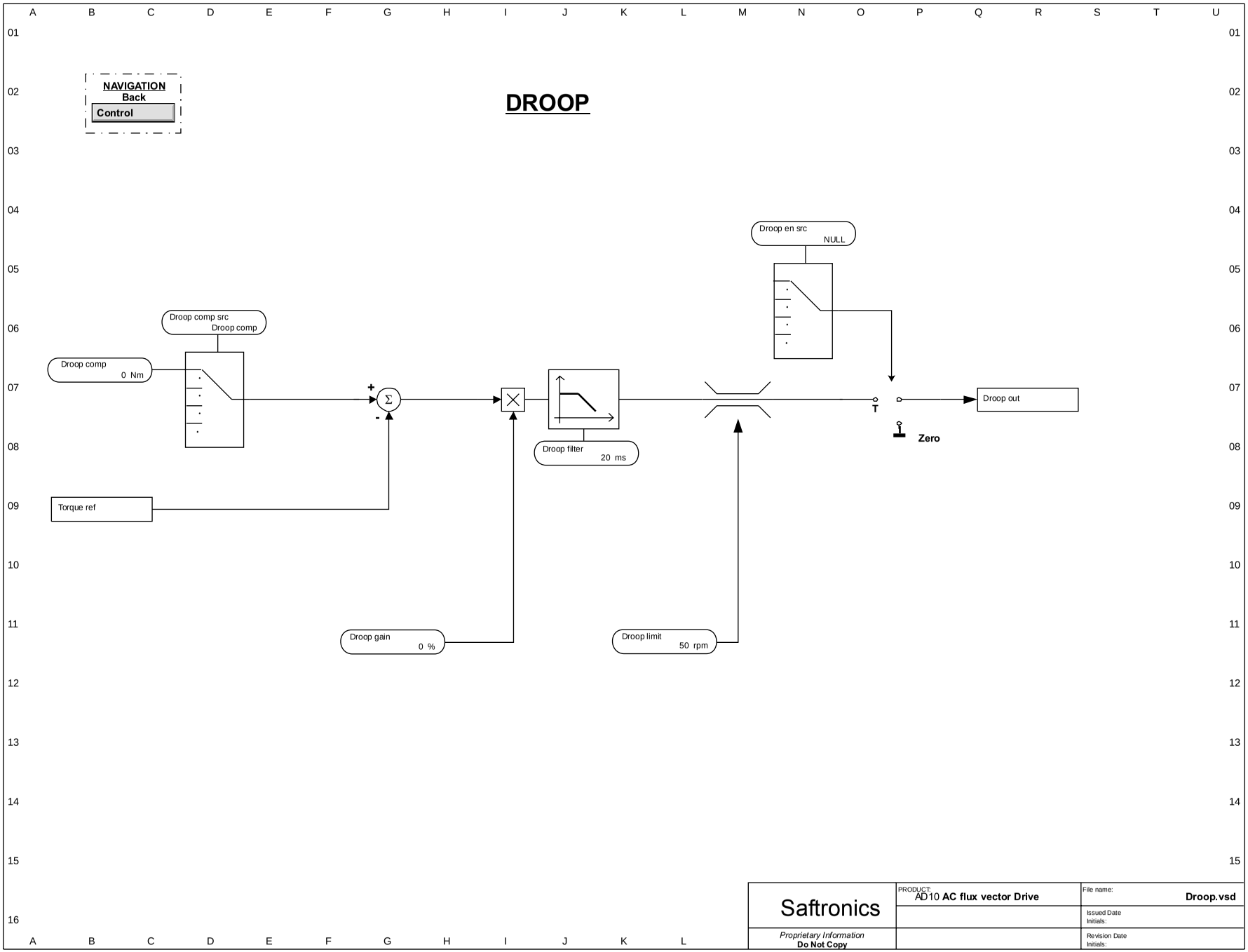
AD10 AC flux vector Drive
File name:
ControlS.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01


INERTIA COMPENSATION
NAVIGATION
Back
Control
Speed ref
I/F cp en src
NULL
Inertia cp flt
30 ms
I/F cp mon
Zero
Inertia src
Int Inertia
Int Inertia
0 kg*m2
Int Friction
0 Nm
Z-1
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
InComp.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy


NAVIGATION
Back
Control
DROOP
Droop en src
NULL
Droop comp src
Droop comp
Droop comp
0 Nm
+
Σ
-
T
Droop out
Zero
Droop filter
20 ms
Torque ref
Droop gain
0 %
Droop limit
50 rpm
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
Droop.vsd
Issued Date
Initials:
Revision Date
Initials:
Proprietary Information
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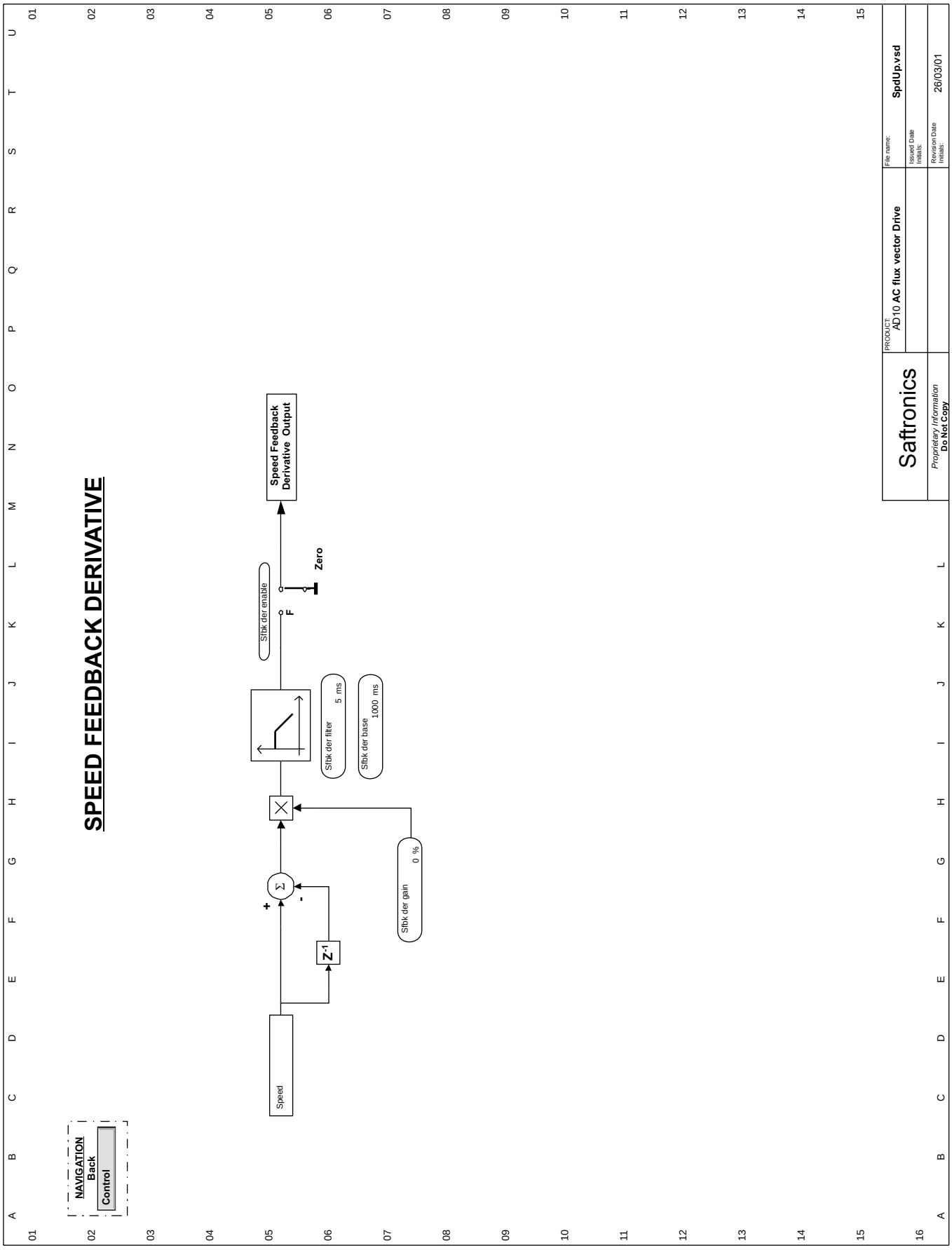
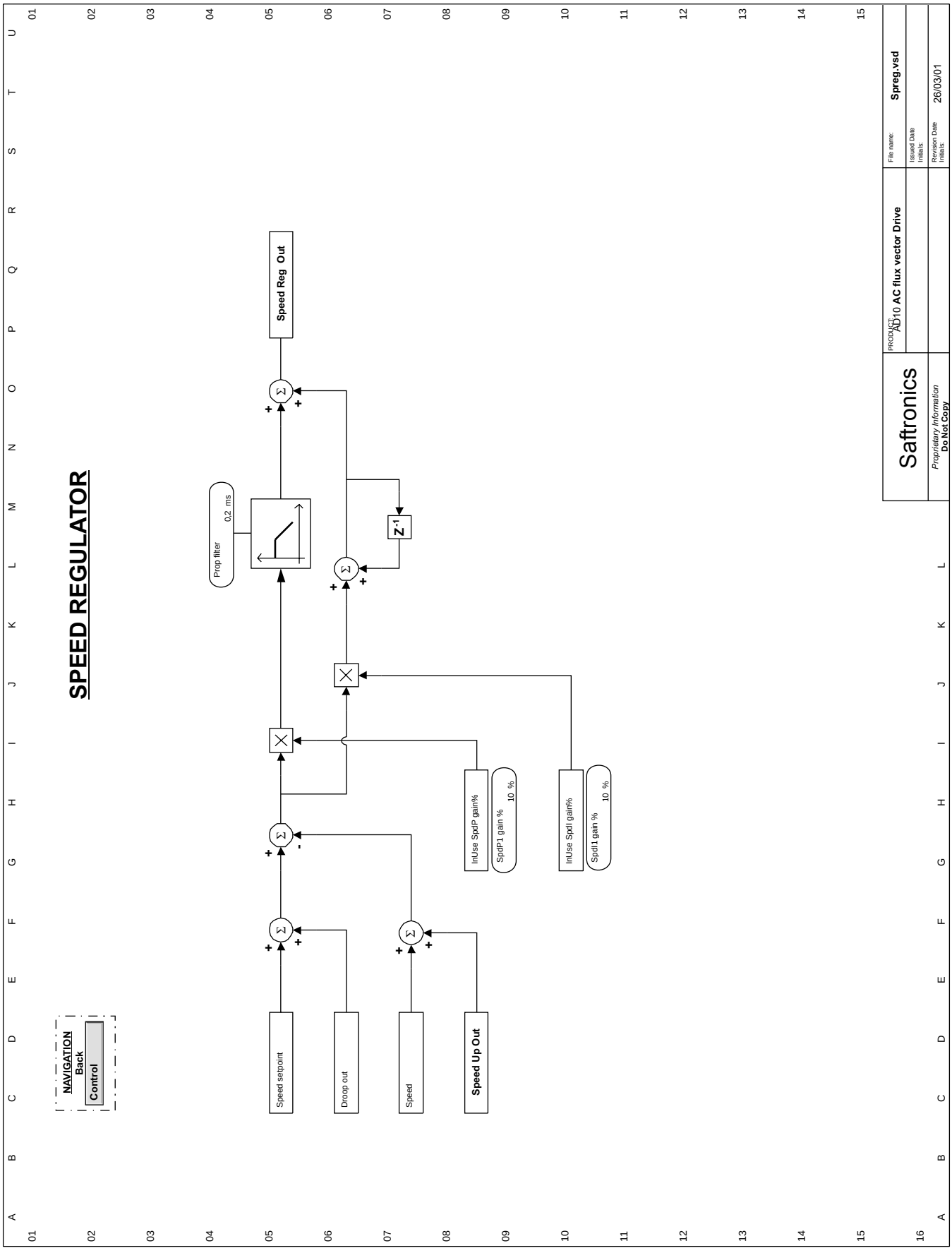
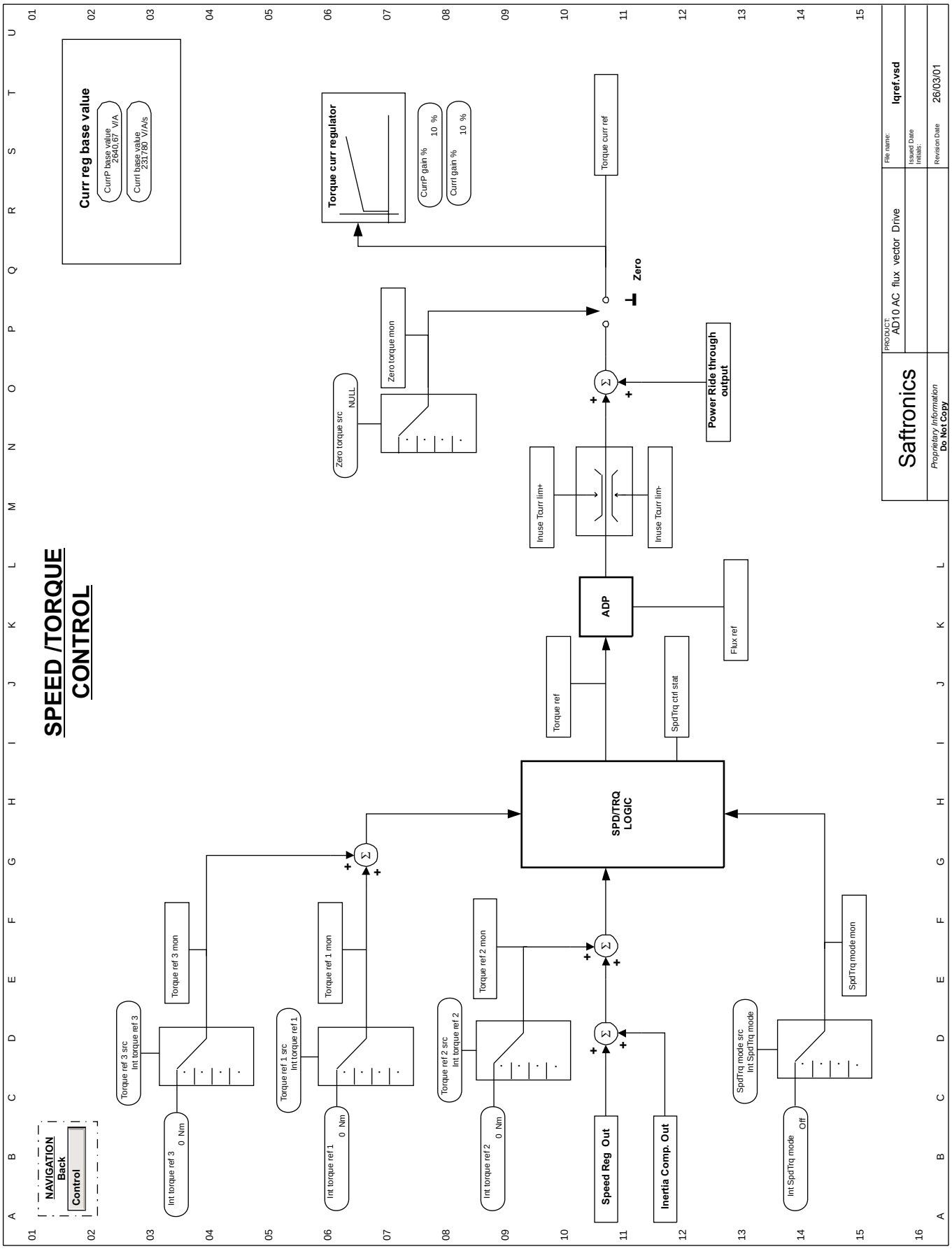
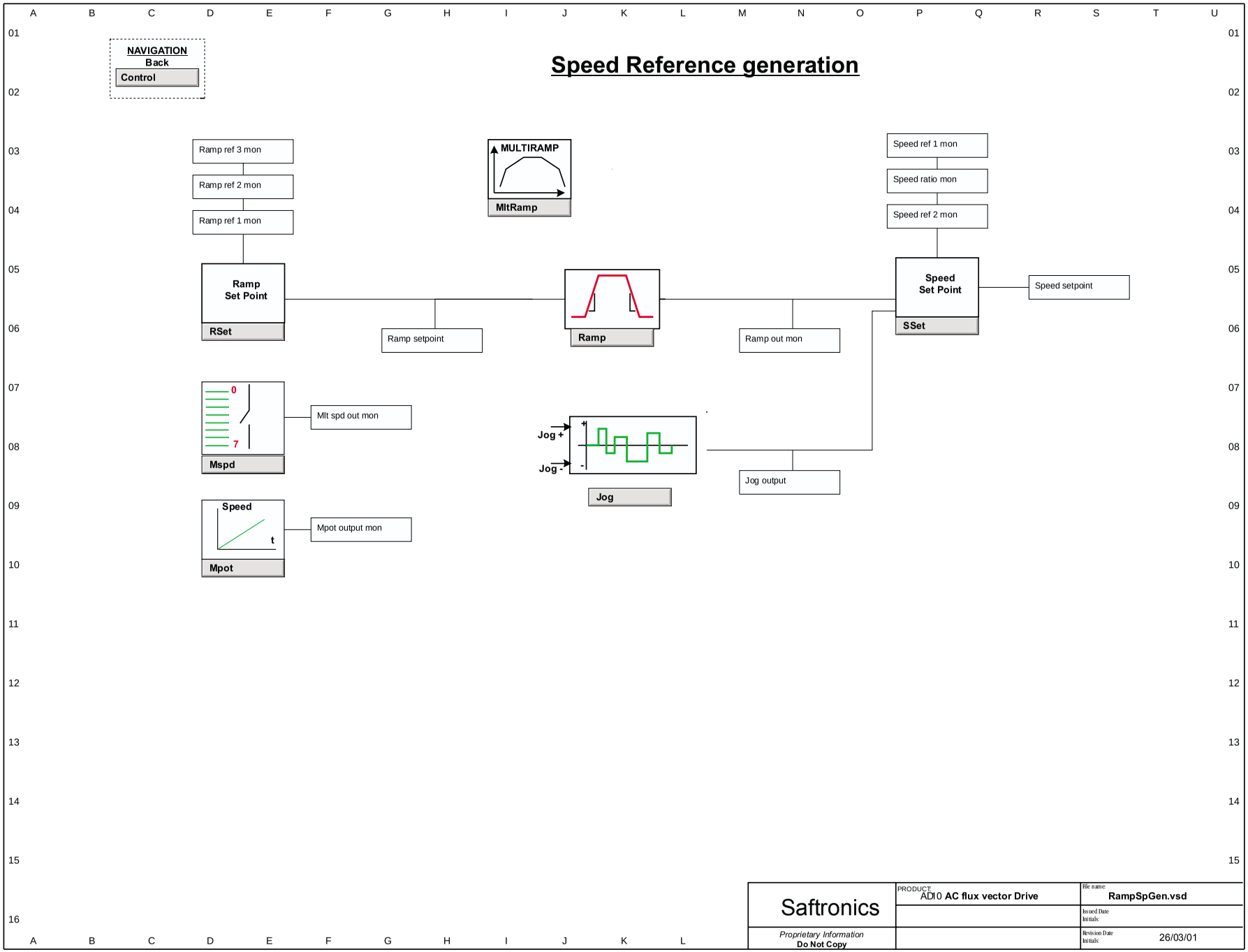

SPEED FEEDBACK DERIVATIVE
NAVIGATION
Back
Control
Speed
Z-1
+
-
Sfbk der gain
0 %
Sfbk der filter
5 ms
Sfbk der base
1000 ms
Sfbk der enable
F
Zero
Speed Feedback
Derivative Output
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
SpdUp.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy


SPEED REGULATOR
NAVIGATION
Back
Control
Speed setpoint
Droop out
Speed
Speed Up Out
InUse SpdP gain%
SpdP1 gain %
10 %
InUse SpdI gain%
SpdI1 gain %
10 %
Prop filter
0,2 ms
Z-1
Speed Reg Out
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
Spreg.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy


SPEED /TORQUE CONTROL
Curr reg base value
CurrP base value 2640.67 V/A
CurrI base value 231.780 V/A/s
Torque curr regulator
CurrP gain % 10 %
CurrI gain % 10 %
Torque curr ref
Zero
Zero torque mon
Zero torque src NULL
Power Ride through output
Inuse Tcurr lim+
Inuse Tcurr lim-
ADP
Torque ref
Flux ref
SpdTrq ctrl stat
SPD/TRQ LOGIC
Torque ref 3 mon
Torque ref 3 src Int torque ref 3
Int torque ref 3 0 Nm
Torque ref 1 mon
Torque ref 1 src Int torque ref 1
Int torque ref 1 0 Nm
Torque ref 2 mon
Torque ref 2 src Int torque ref 2
Int torque ref 2 0 Nm
Speed Reg Out
Inertia Comp. Out
SpdTrq mode mon
SpdTrq mode src Int SpdTrq mode
Int SpdTrq mode Off
NAVIGATION
Back
Control
Saftronics
PRODUCT AD10 AC flux vector Drive
File name: Iqref.vsd
Issued Date
Initials:
Revision Date 26/03/01
Proprietary Information
Do Not Copy

Speed Reference generation



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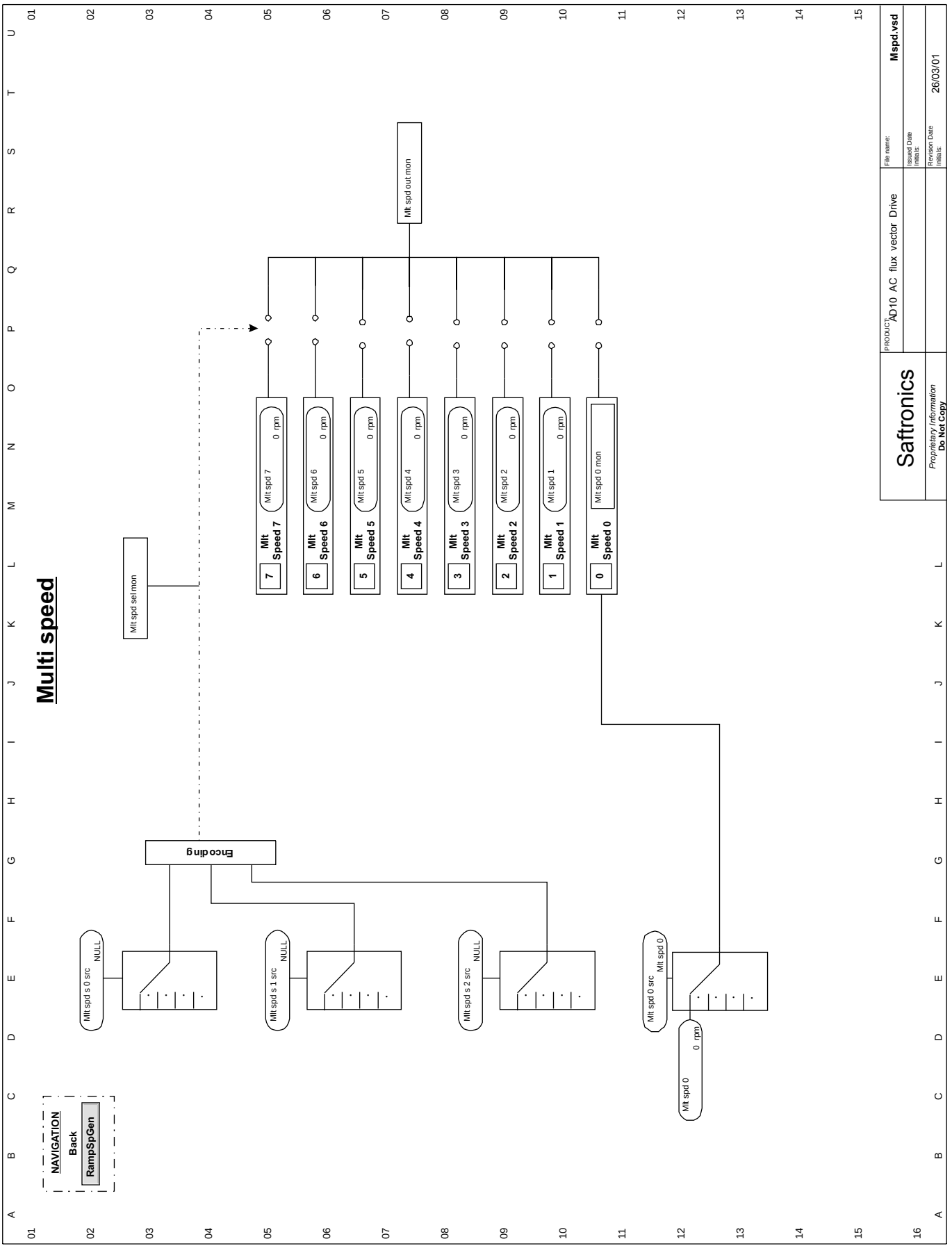
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


Multi speed
Mlt spd sel mon
Mlt spd out mon
Mlt Speed 7
Mlt spd 7
0 rpm
Mlt Speed 6
Mlt spd 6
0 rpm
Mlt Speed 5
Mlt spd 5
0 rpm
Mlt Speed 4
Mlt spd 4
0 rpm
Mlt Speed 3
Mlt spd 3
0 rpm
Mlt Speed 2
Mlt spd 2
0 rpm
Mlt Speed 1
Mlt spd 1
0 rpm
Mlt Speed 0
Mlt spd 0 mon
Encoding
Mlt spd s 0 src
NULL
Mlt spd s 1 src
NULL
Mlt spd s 2 src
NULL
Mlt spd 0 src
Mlt spd 0
Mlt spd 0
0 rpm
NAVIGATION
Back
RampSpGen
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
Mspd.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
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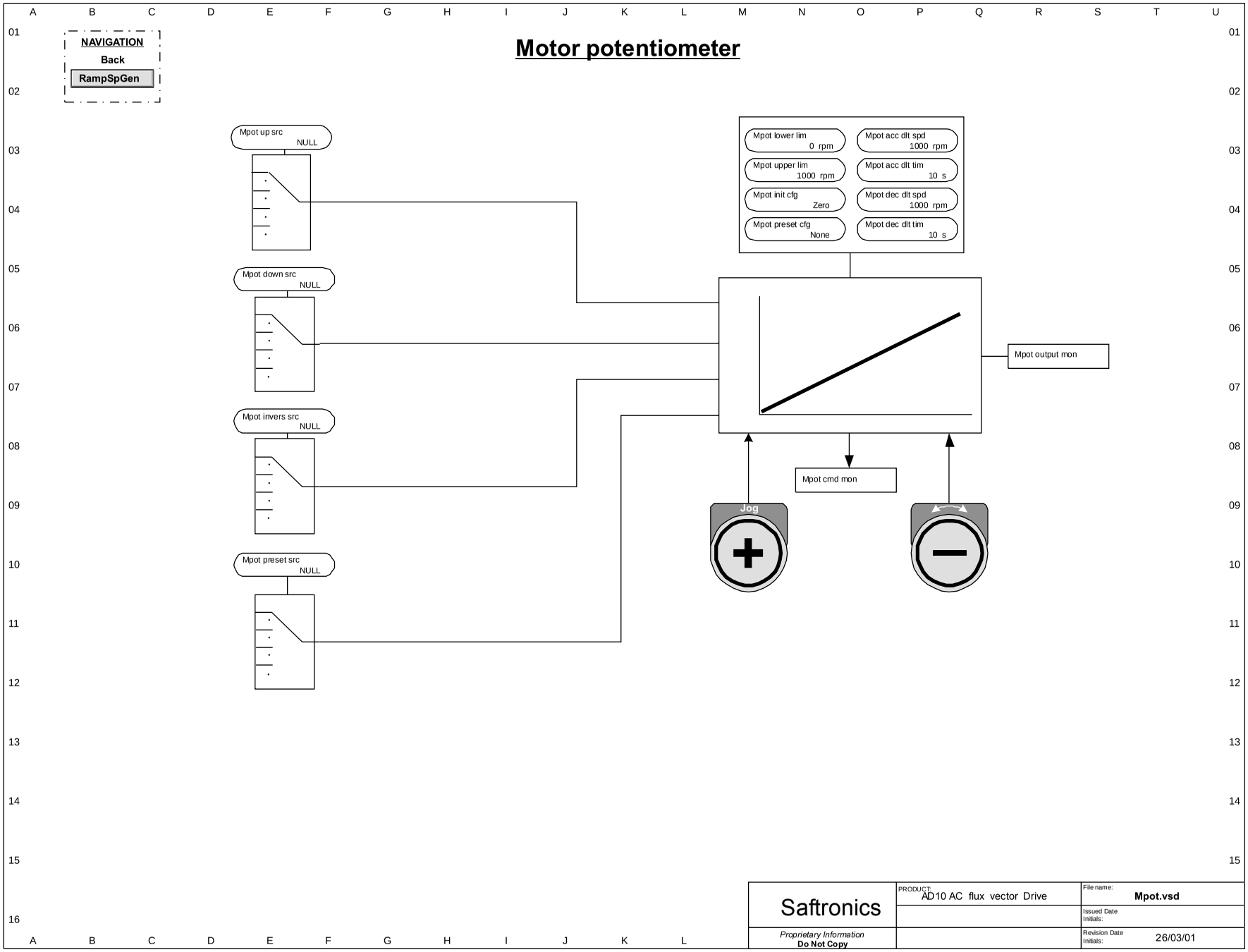
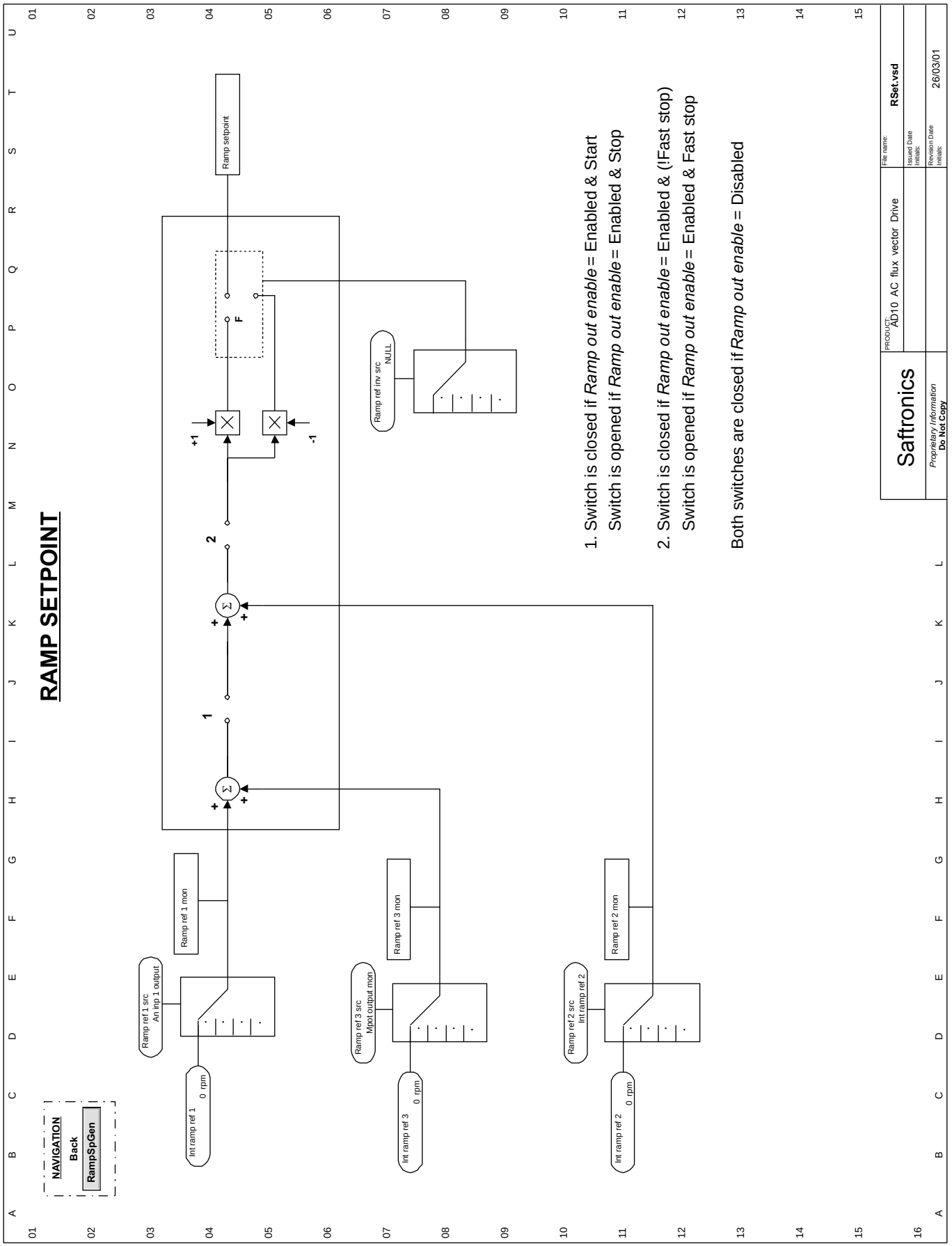
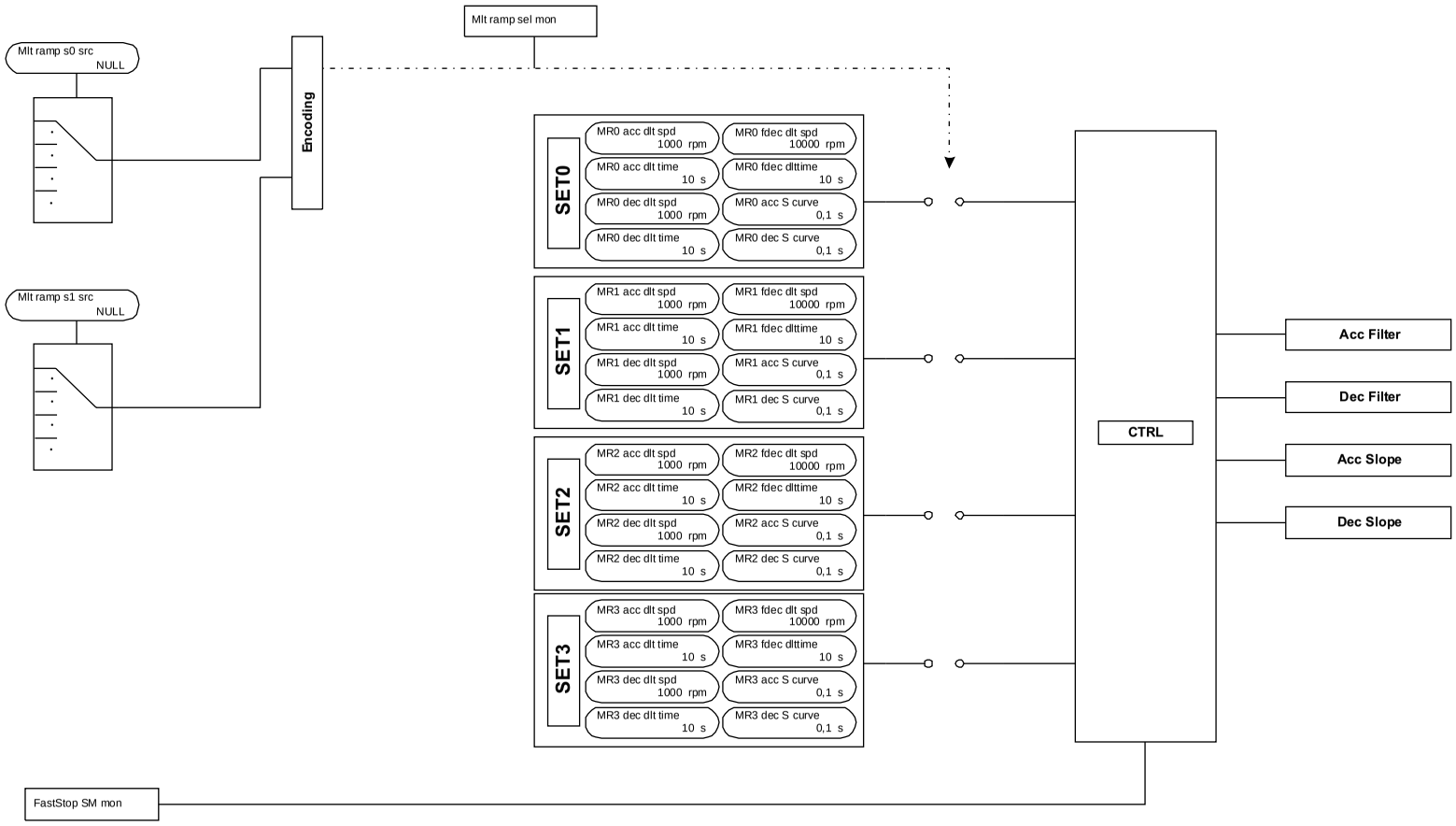

NAVIGATION
Back
RampSpGen
Motor potentiometer
Mpot up src
NULL
Mpot down src
NULL
Mpot invers src
NULL
Mpot preset src
NULL
Mpot lower lim
0 rpm
Mpot upper lim
1000 rpm
Mpot init cfg
Zero
Mpot preset cfg
None
Mpot acc dlt spd
1000 rpm
Mpot acc dlt tim
10 s
Mpot dec dlt spd
1000 rpm
Mpot dec dlt tim
10 s
Mpot output mon
Mpot cmd mon
Jog
Saftronics
Proprietary Information
Do Not Copy
PRODUCT:
AD10 AC flux vector Drive
File name:
Mpot.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01

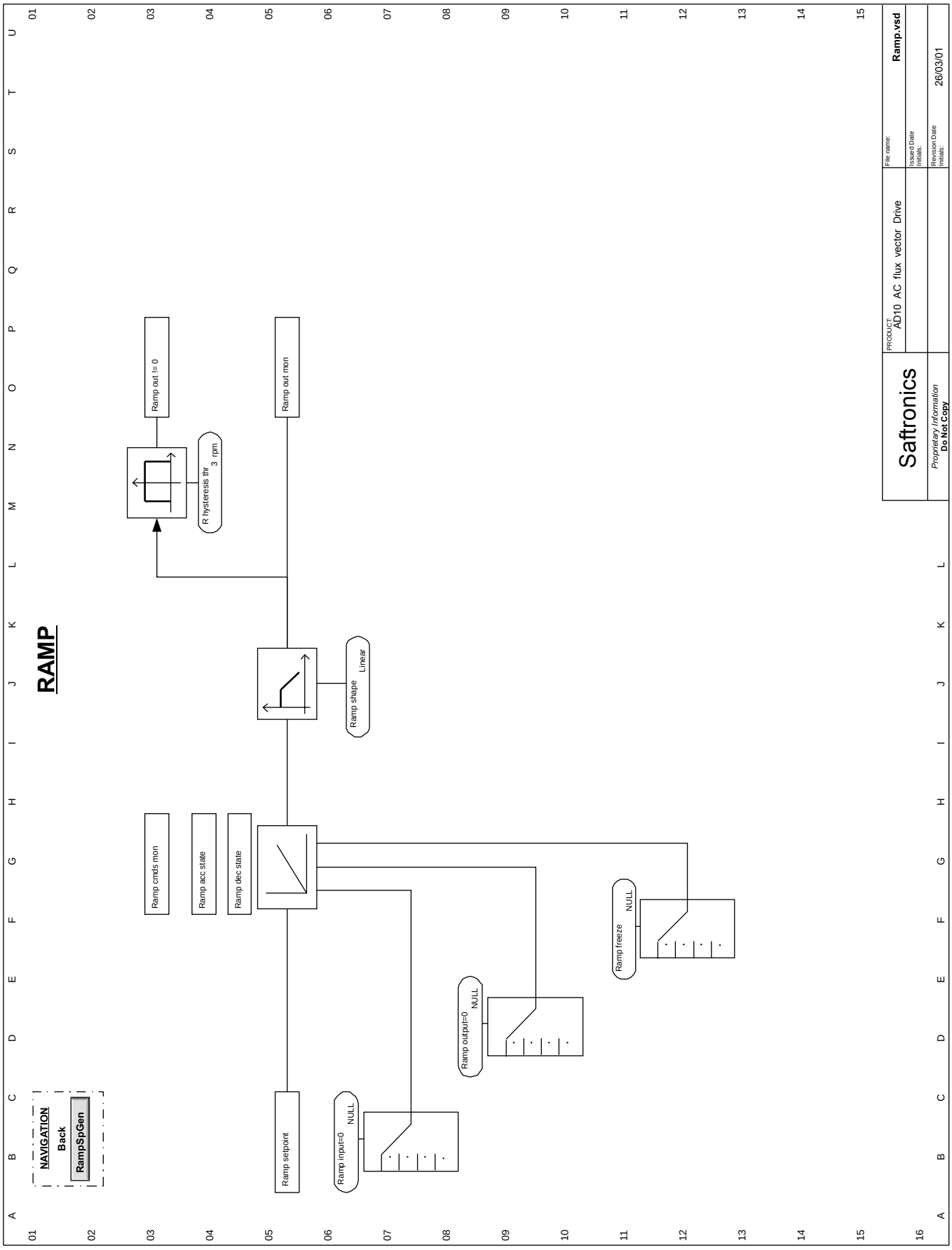

RAMP SETPOINT
NAVIGATION
Back
RampSpGen
Ramp ref 1 src
An inp 1 output
Ramp ref 1 mon
Int ramp ref 1
0 rpm
Ramp ref 3 src
Mpot output mon
Ramp ref 3 mon
Int ramp ref 3
0 rpm
Ramp ref 2 src
Int ramp ref 2
Ramp ref 2 mon
Int ramp ref 2
0 rpm
Ramp ref inv src
NULL
Ramp setpoint
+1
-1
F
1
2
1. Switch is closed if *Ramp out enable* = Enabled & Start
Switch is opened if *Ramp out enable* = Enabled & Stop
2. Switch is closed if *Ramp out enable* = Enabled & (!Fast stop)
Switch is opened if *Ramp out enable* = Enabled & Fast stop
Both switches are closed if *Ramp out enable* = Disabled
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
RSet.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy

MULTIRAMP

NAVIGATION
Back
RampSpGen



Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: MLTRamp.vsd
		Issued Date / Initials:
Proprietary Information **Do Not Copy**		Revision Date / Initials: 26/03/01


RAMP
NAVIGATION
Back
RampSpGen
Ramp setpoint
Ramp input=0
NULL
Ramp output=0
NULL
Ramp freeze
NULL
Ramp cmds mon
Ramp acc state
Ramp dec state
Ramp shape
Linear
Ramp out mon
Ramp out != 0
R hysteresis thr
3 rpm
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
Ramp.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
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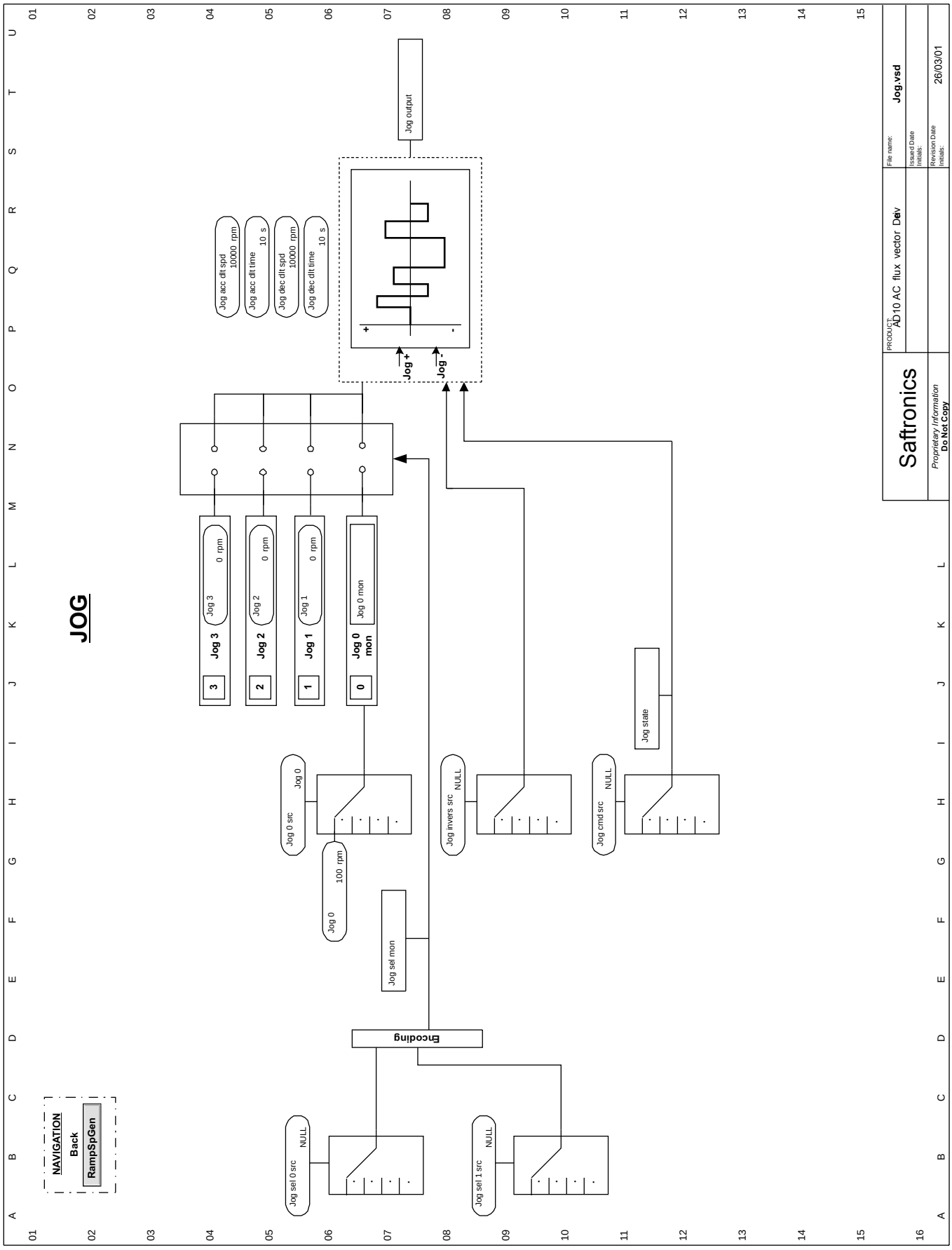
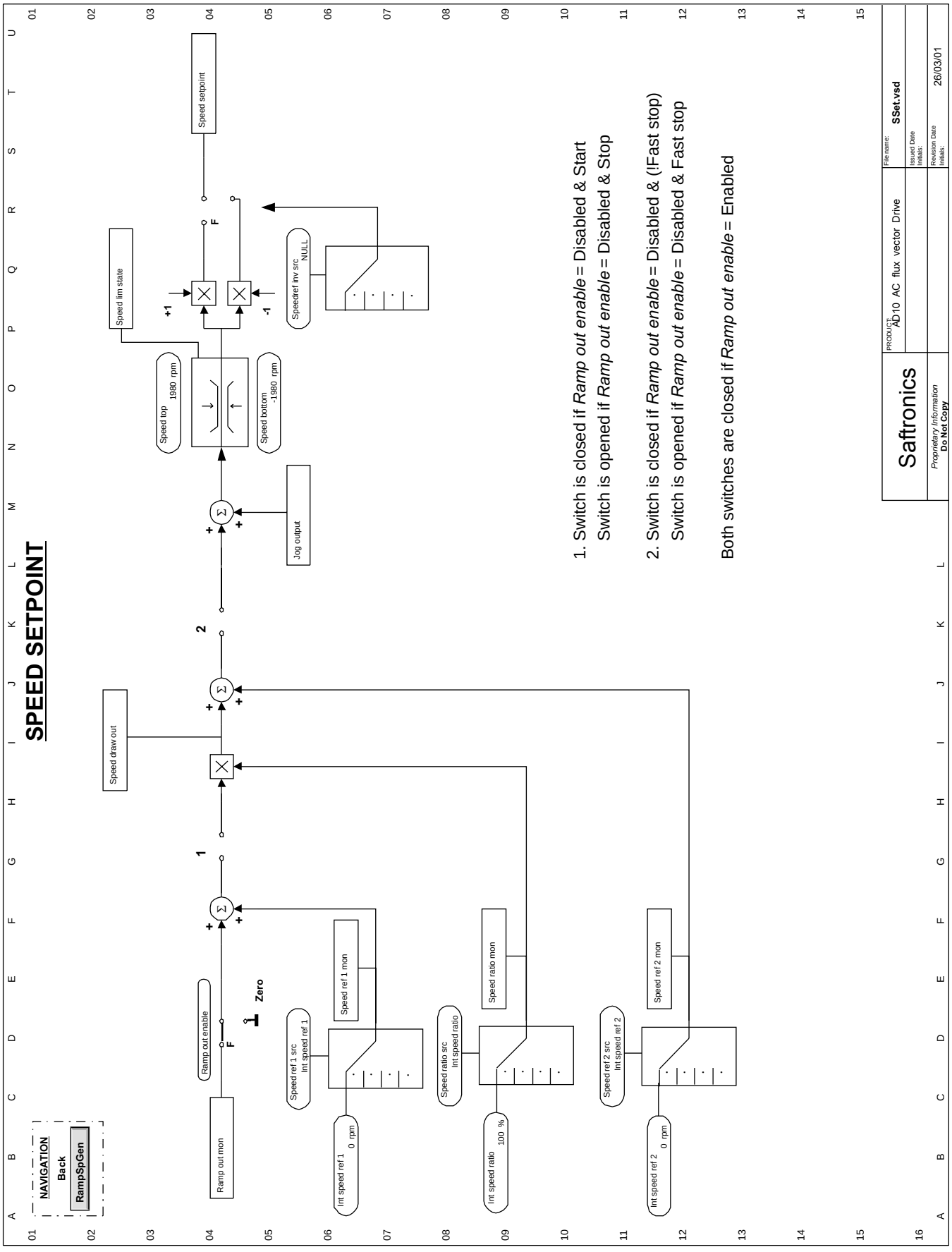
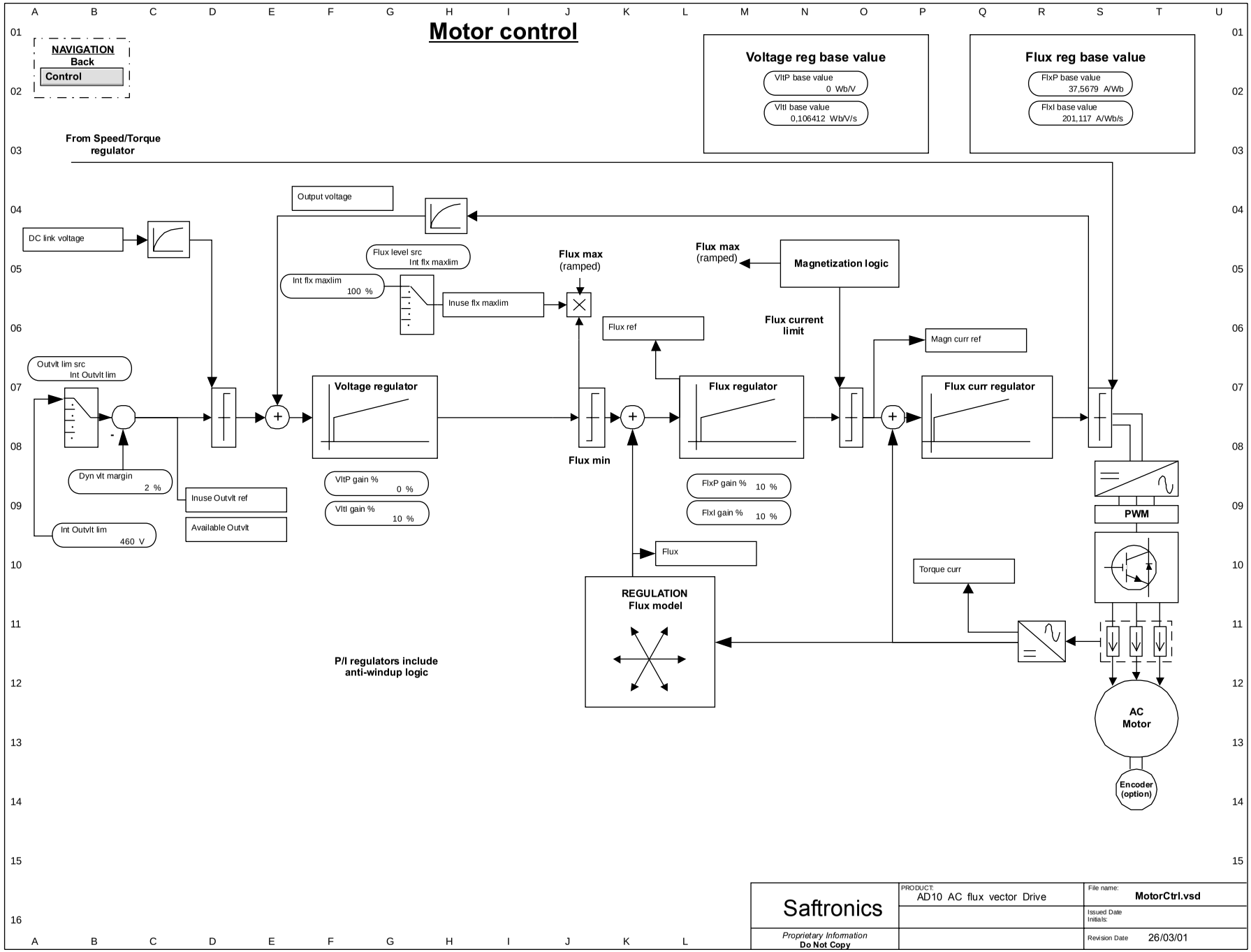

JOG
NAVIGATION
Back
RampSpGen
Jog output
Jog +
Jog -
Jog acc dlt spd 10000 rpm
Jog acc dlt time 10 s
Jog dec dlt spd 10000 rpm
Jog dec dlt time 10 s
Jog 3
Jog 2
Jog 1
Jog 0 mon
Jog 3 0 rpm
Jog 2 0 rpm
Jog 1 0 rpm
Jog 0 mon
Encoding
Jog sel mon
Jog 0 src Jog 0
Jog 0 100 rpm
Jog invers src NULL
Jog cmd src NULL
Jog state
Jog sel 0 src NULL
Jog sel 1 src NULL
Saftronics
PRODUCT AD10 AC flux vector Drv
File name: Jog.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
Do Not Copy


SPEED SETPOINT
NAVIGATION
Back
RampSpGen
Ramp out mon
Ramp out enable
F
Zero
Int speed ref 1
0 rpm
Speed ref 1 src
Int speed ref 1
Speed ref 1 mon
Int speed ratio
100 %
Speed ratio src
Int speed ratio
Speed ratio mon
Int speed ref 2
0 rpm
Speed ref 2 src
Int speed ref 2
Speed ref 2 mon
Speed draw out
Jog output
Speed top
1980 rpm
Speed bottom
-1980 rpm
Speed lim state
+1
-1
Speedref inv src
NULL
Speed setpoint
1. Switch is closed if Ramp out enable = Disabled & Start
Switch is opened if Ramp out enable = Disabled & Stop
2. Switch is closed if Ramp out enable = Disabled & (!Fast stop)
Switch is opened if Ramp out enable = Disabled & Fast stop
Both switches are closed if Ramp out enable = Enabled
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
SSet.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy


Motor control
NAVIGATION
Back
Control
Voltage reg base value
VltP base value
0 Wb/V
Vltl base value
0,106412 Wb/V/s
Flux reg base value
FlxP base value
37,5679 A/Wb
Flxl base value
201,117 A/Wb/s
From Speed/Torque regulator
Output voltage
DC link voltage
Flux level src
Int flx maxlim
Int flx maxlim
100 %
Inuse flx maxlim
Flux max
(ramped)
Flux max
(ramped)
Magnetization logic
Flux current limit
Flux ref
Magn curr ref
Outvlt lim src
Int Outvlt lim
Voltage regulator
Flux regulator
Flux curr regulator
Flux min
Dyn vlt margin
2 %
Inuse Outvlt ref
Available Outvlt
Int Outvlt lim
460 V
VltP gain %
0 %
Vltl gain %
10 %
FlxP gain %
10 %
Flxl gain %
10 %
PWM
Flux
Torque curr
REGULATION
Flux model
P/I regulators include anti-windup logic
AC Motor
Encoder (option)
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
MotorCtrl.vsd
Issued Date
Initials:
Revision Date
26/03/01
Proprietary Information
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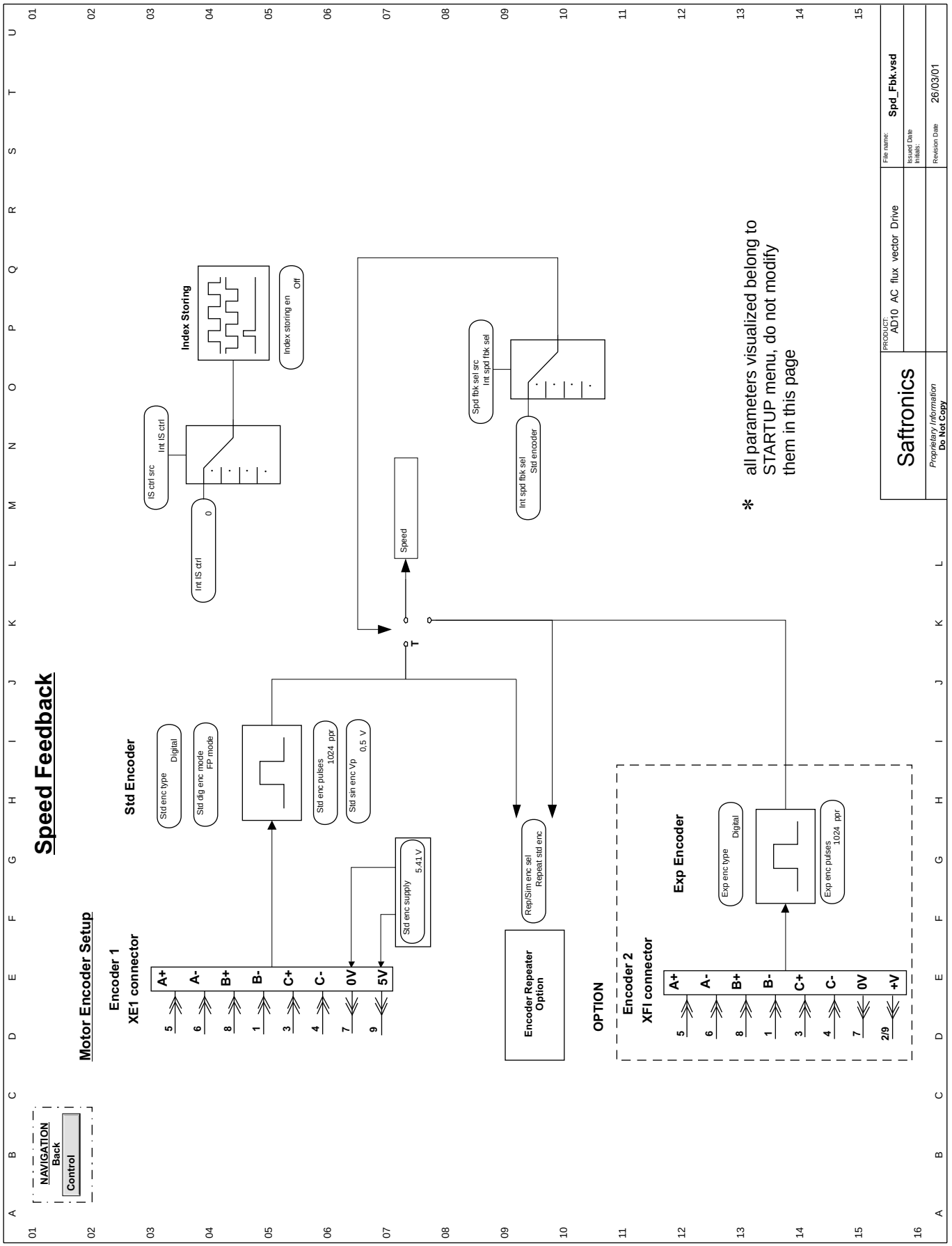
Speed Feedback
Motor Encoder Setup
NAVIGATION
Back
Control
Encoder 1
XE1 connector
Std Encoder
Std enc type
Digital
Std dig enc mode
FP mode
Std enc pulses
1024 ppr
Std sin enc Vp
0.5 V
Std enc supply
5.41 V
A+
A-
B+
B-
C+
C-
0V
5V
Index Storing
Index storing en
Off
IS ctrl src
Int IS ctrl
Int IS ctrl
0
Speed
Spd fbk sel src
Int spd fbk sel
Int spd fbk sel
Std encoder
Rep/Sim enc sel
Repeat std enc
Encoder Repeater Option
OPTION
Encoder 2
XFI connector
Exp Encoder
Exp enc type
Digital
Exp enc pulses
1024 ppr
+V
2/9
* all parameters visualized belong to STARTUP menu, do not modify them in this page
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
Spd_Fbk.vsd
Issued Date
Initials:
Revision Date
26/03/01
Proprietary Information
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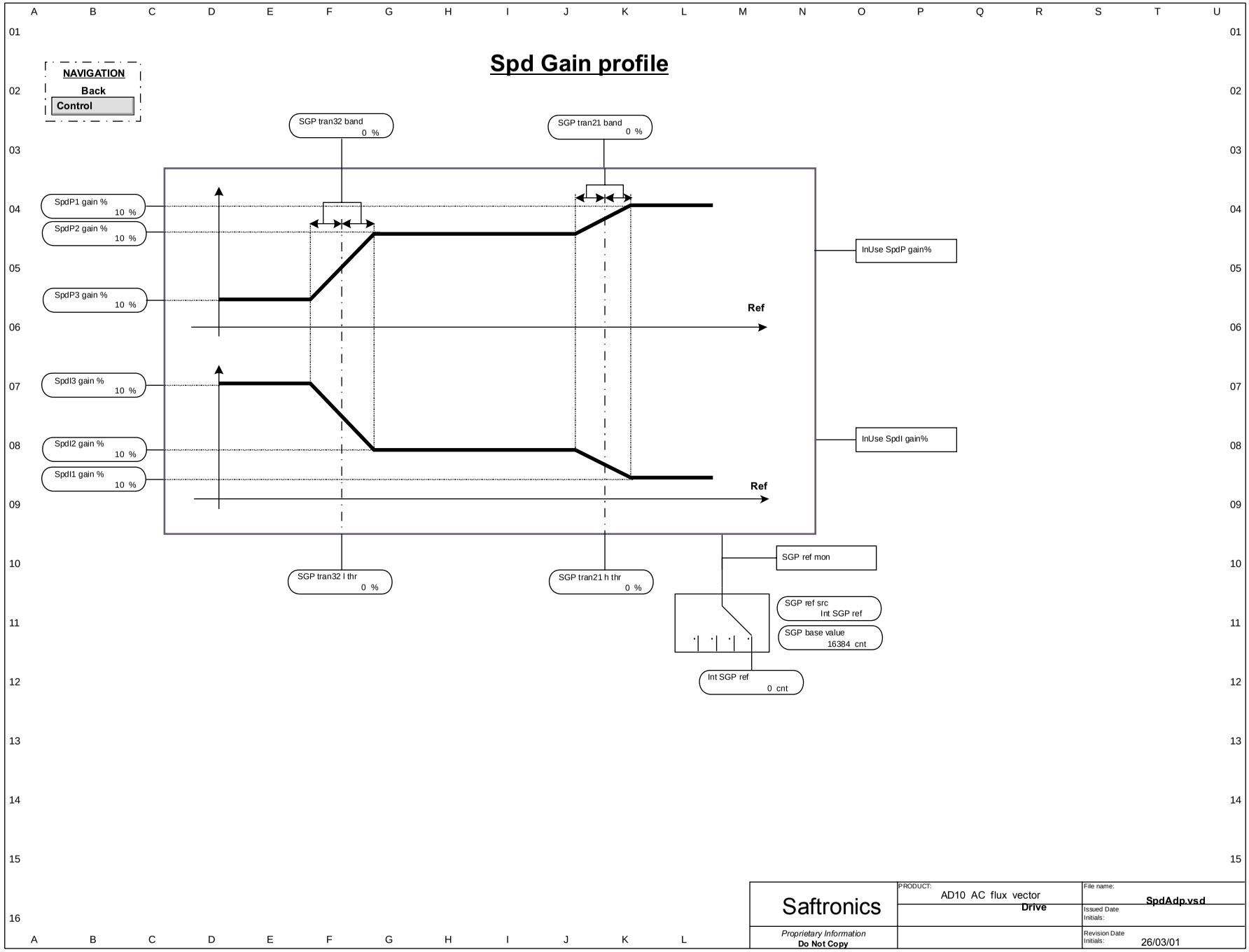
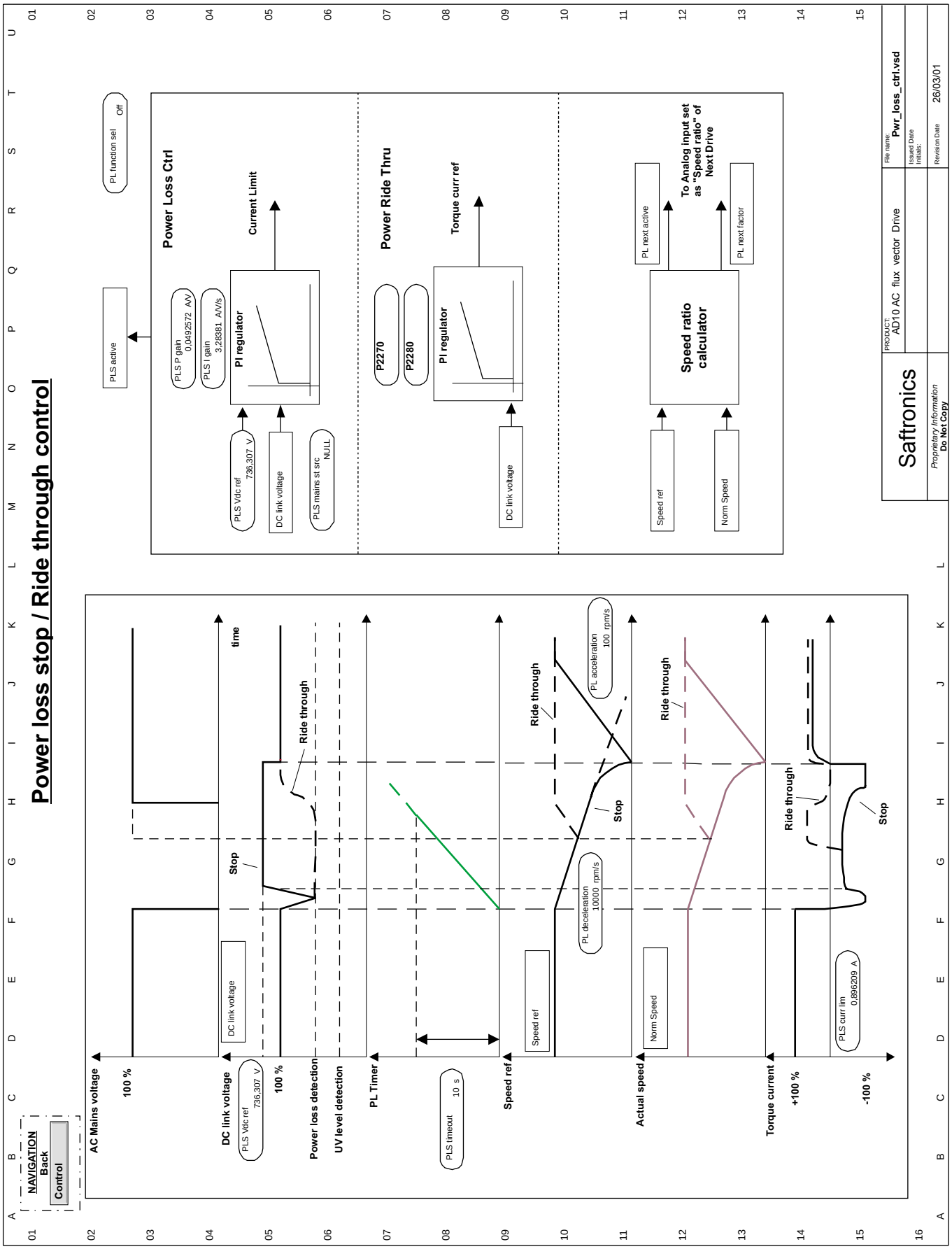
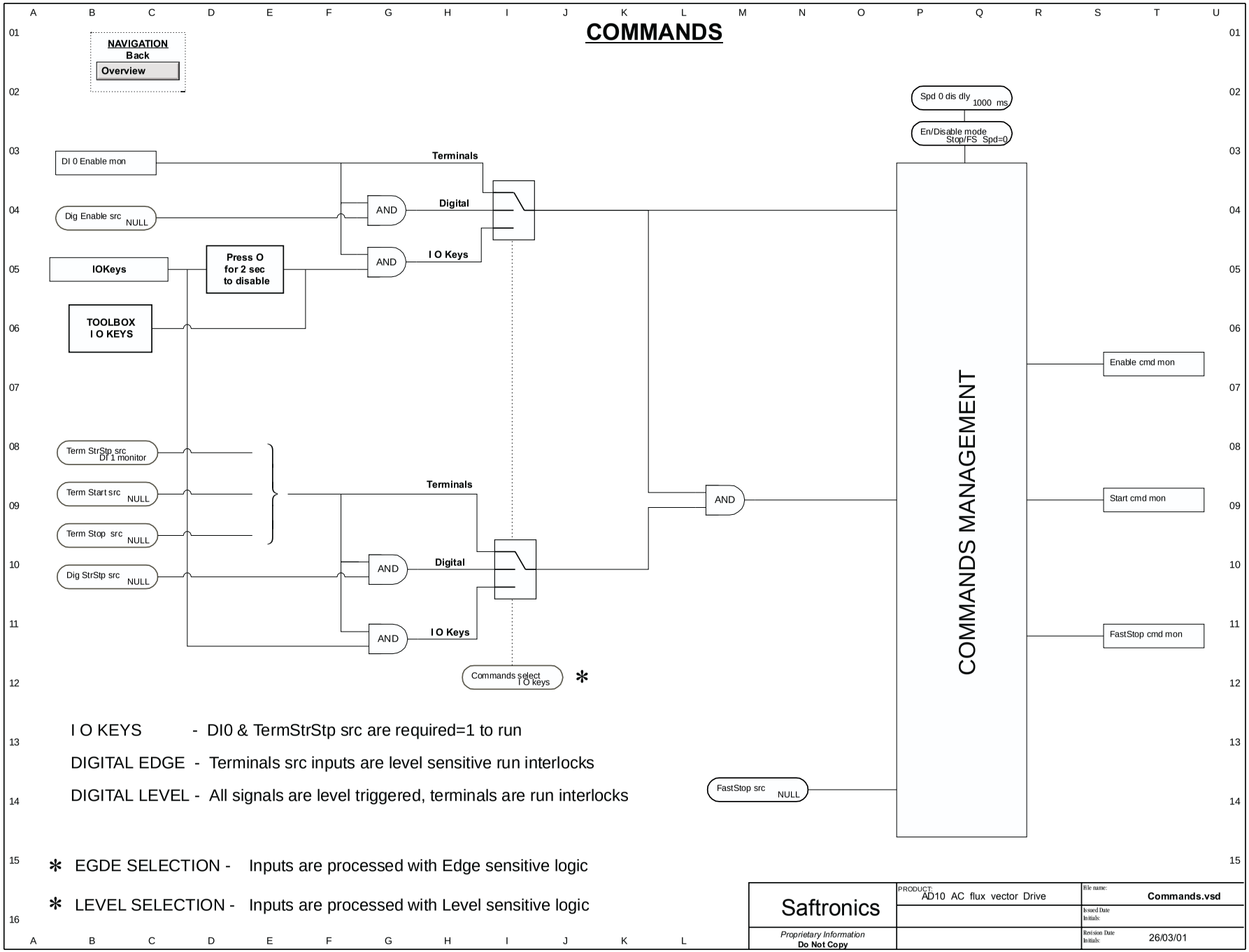

Spd Gain profile
NAVIGATION
Back
Control
SGP tran32 band
0 %
SGP tran21 band
0 %
SpdP1 gain %
10 %
SpdP2 gain %
10 %
SpdP3 gain %
10 %
SpdI3 gain %
10 %
SpdI2 gain %
10 %
SpdI1 gain %
10 %
Ref
Ref
InUse SpdP gain%
InUse SpdI gain%
SGP tran32 l thr
0 %
SGP tran21 h thr
0 %
SGP ref mon
SGP ref src
Int SGP ref
SGP base value
16384 cnt
Int SGP ref
0 cnt
Saftronics
Proprietary Information
Do Not Copy
PRODUCT:
AD10 AC flux vector
Drive
File name:
SpdAdp.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01


Power loss stop / Ride through control
NAVIGATION
Back
Control
PLS active
PL function sel
Off
Power Loss Ctrl
PLS P gain
0,0492572 A/V
PLS I gain
3,28381 A/V/s
PI regulator
Current Limit
PLS Vdc ref
736,307 V
DC link voltage
PLS mains st src
NULL
Power Ride Thru
P2270
P2280
PI regulator
Torque curr ref
DC link voltage
Speed ratio calculator
PL next active
PL next factor
To Analog input set as "Speed ratio" of Next Drive
Speed ref
Norm Speed
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
Pwr_loss_ctrl.vsd
Issued Date
Initials:
Revision Date
26/03/01
Proprietary Information
Do Not Copy
AC Mains voltage
100 %
DC link voltage
PLS Vdc ref
736,307 V
100 %
Power loss detection
UV level detection
PL Timer
PLS timeout
10 s
Speed ref
Actual speed
Torque current
+100 %
-100 %
time
Stop
Ride through
PL deceleration
10000 rpm/s
PL acceleration
100 rpm/s
PLS curr lim
0,896209 A


COMMANDS
NAVIGATION
Back
Overview
Spd 0 dis dly
1000 ms
En/Disable mode
Stop/FS Spd=0
DI 0 Enable mon
Terminals
Dig Enable src
NULL
AND
Digital
AND
I O Keys
IOKeys
Press O
for 2 sec
to disable
TOOLBOX
I O KEYS
Term StrStp src
DI 1 monitor
Term Start src
NULL
Term Stop src
NULL
Dig StrStp src
NULL
Terminals
AND
Digital
AND
I O Keys
Commands select
I O keys
*
AND
COMMANDS MANAGEMENT
Enable cmd mon
Start cmd mon
FastStop cmd mon
FastStop src
NULL
I O KEYS - DI0 & TermStrStp src are required=1 to run
DIGITAL EDGE - Terminals src inputs are level sensitive run interlocks
DIGITAL LEVEL - All signals are level triggered, terminals are run interlocks
* EGDE SELECTION - Inputs are processed with Edge sensitive logic
* LEVEL SELECTION - Inputs are processed with Level sensitive logic
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
Commands.vsd
Issued Date
Initials:
Proprietary Information
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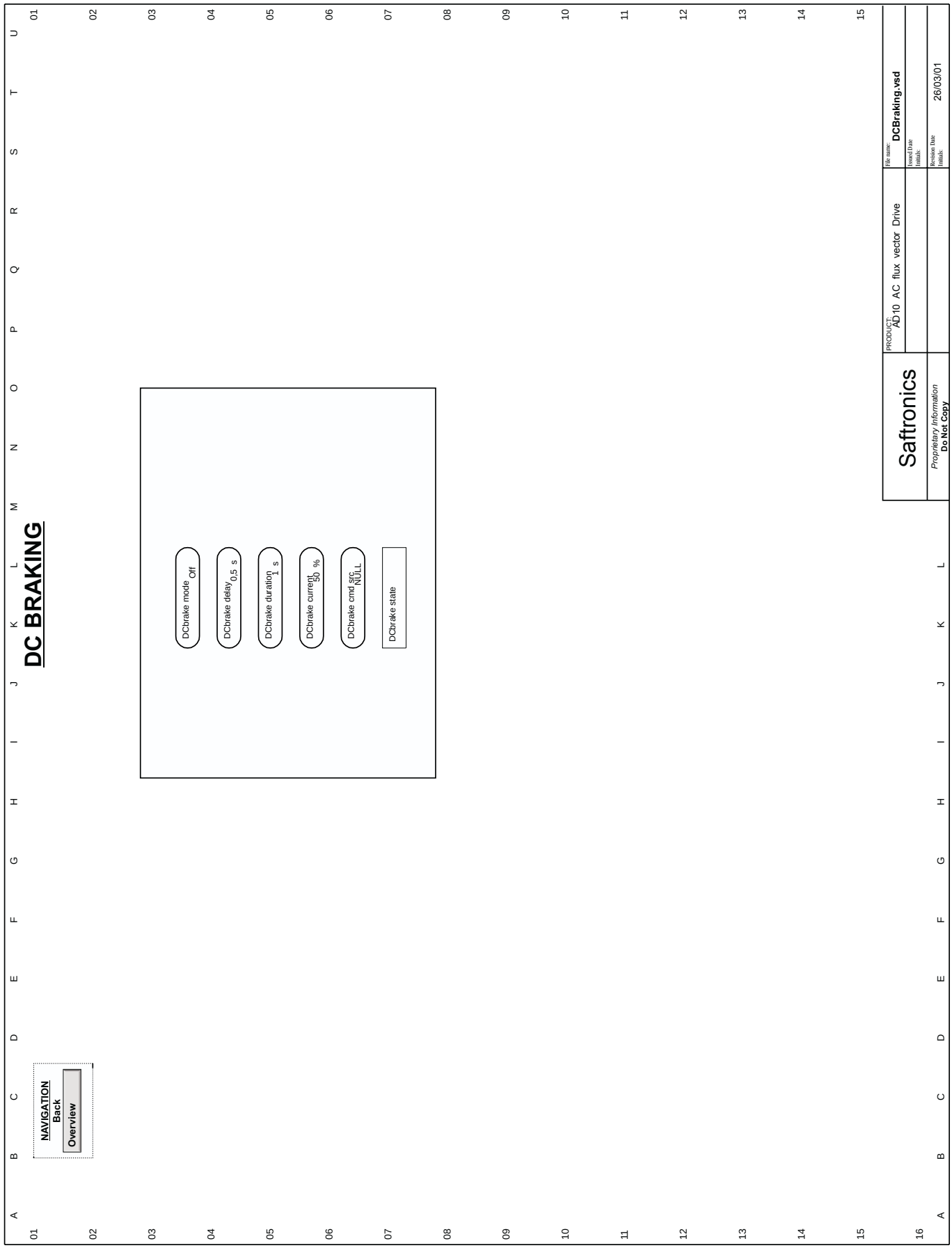
Initials:
26/03/01


NAVIGATION
Back
Overview
DC BRAKING
DCbrake mode Off
DCbrake delay 0.5 s
DCbrake duration 1 s
DCbrake current 50 %
DCbrake cmd src NULL
DCbrake state
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: DCBraking.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
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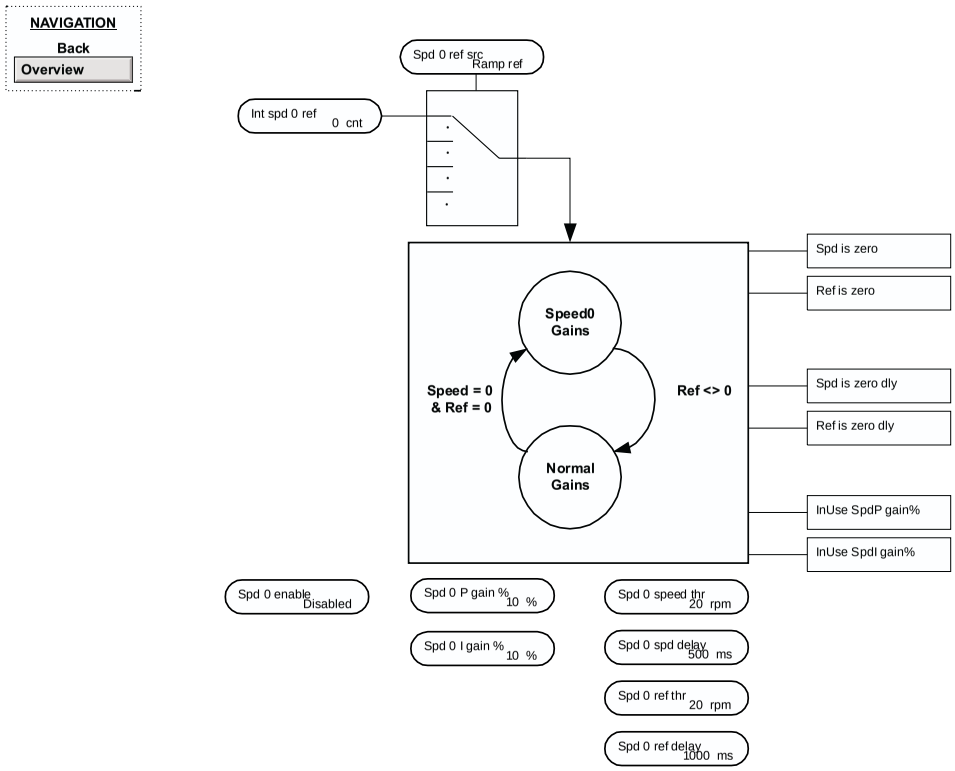
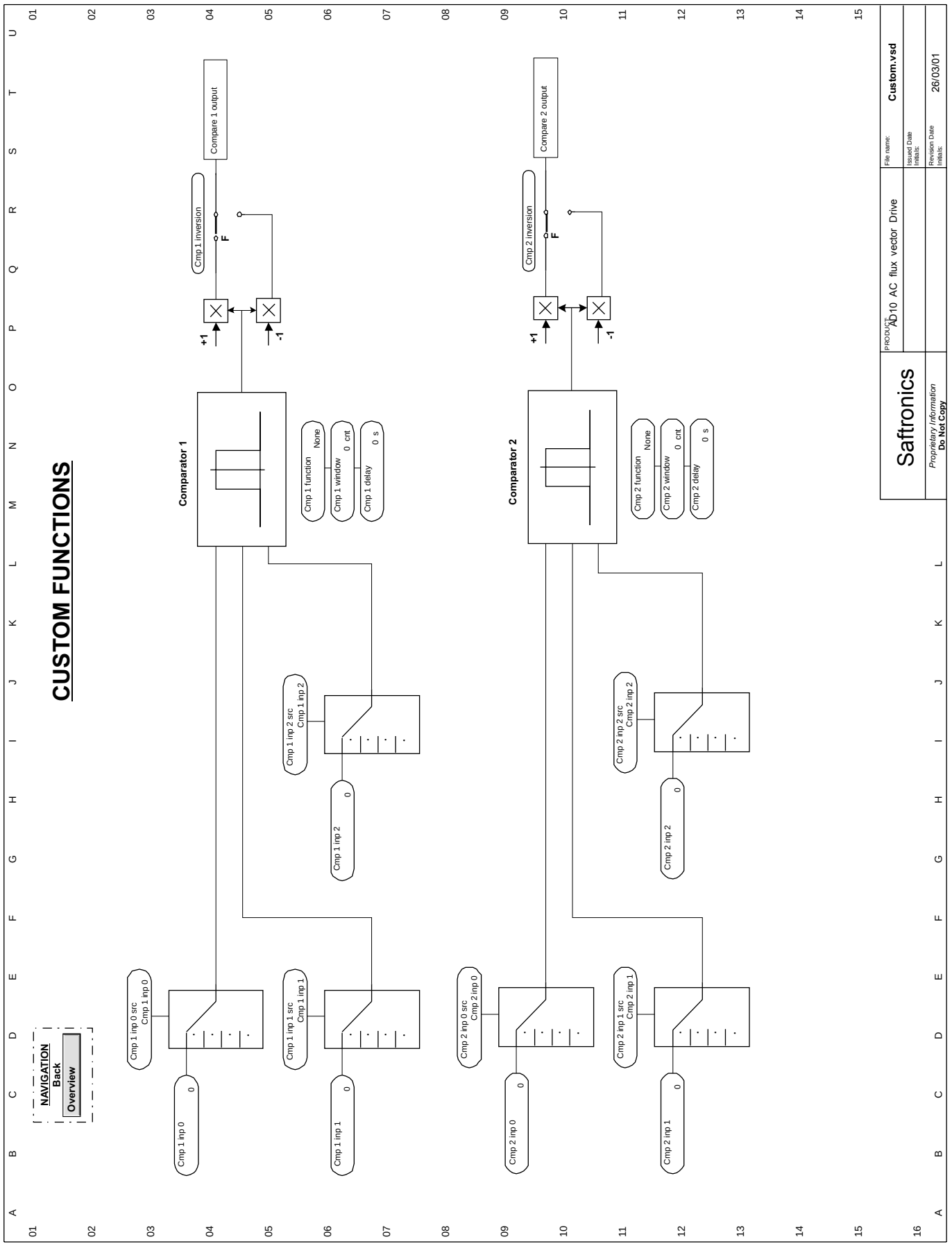
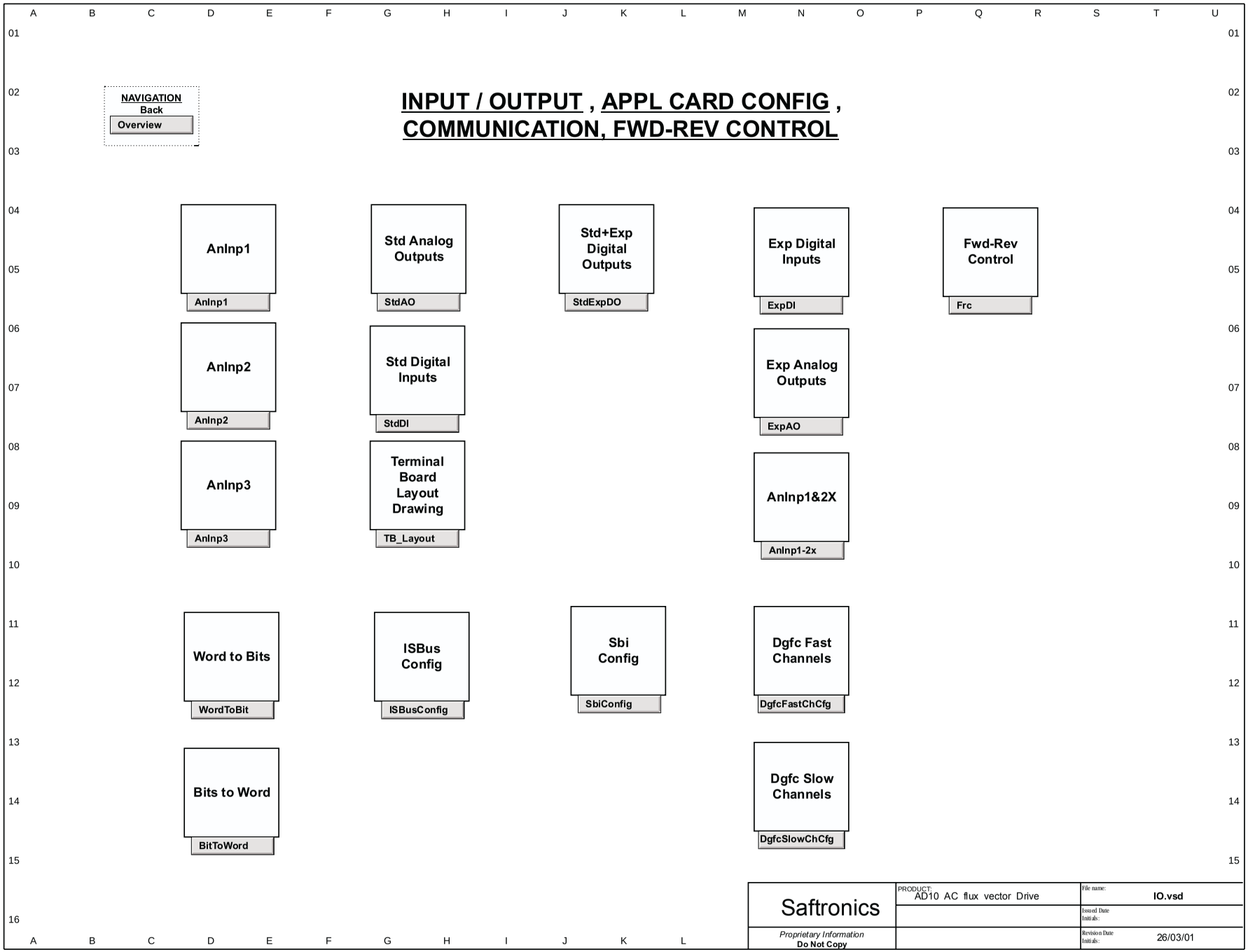
Speed Zero block



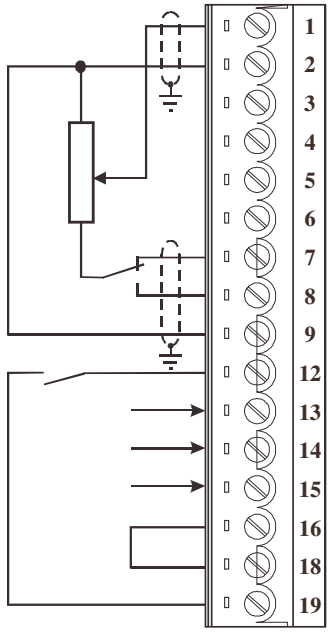
Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: SpdZero.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


CUSTOM FUNCTIONS
NAVIGATION
Back
Overview
Comparator 1
Cmp 1 inversion
Compare 1 output
Cmp 1 function None
Cmp 1 window 0 cnt
Cmp 1 delay 0 s
Cmp 1 inp 0 src Cmp 1 inp 0
Cmp 1 inp 1 src Cmp 1 inp 1
Cmp 1 inp 2 src Cmp 1 inp 2
Cmp 1 inp 0
Cmp 1 inp 1
Cmp 1 inp 2
Comparator 2
Cmp 2 inversion
Compare 2 output
Cmp 2 function None
Cmp 2 window 0 cnt
Cmp 2 delay 0 s
Cmp 2 inp 0 src Cmp 2 inp 0
Cmp 2 inp 1 src Cmp 2 inp 1
Cmp 2 inp 2 src Cmp 2 inp 2
Cmp 2 inp 0
Cmp 2 inp 1
Cmp 2 inp 2
+1
-1
F
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: Custom.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
Do Not Copy

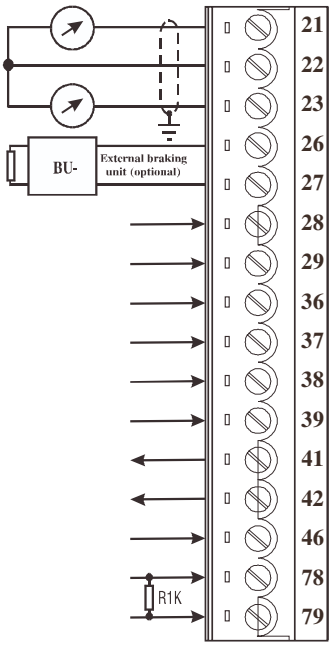

NAVIGATION
Back
Overview
INPUT / OUTPUT , APPL CARD CONFIG , COMMUNICATION, FWD-REV CONTROL
AnInp1
AnInp1
Std Analog Outputs
StdAO
Std+Exp Digital Outputs
StdExpDO
Exp Digital Inputs
ExpDI
Fwd-Rev Control
Frc
AnInp2
AnInp2
Std Digital Inputs
StdDI
Exp Analog Outputs
ExpAO
AnInp3
AnInp3
Terminal Board Layout Drawing
TB_Layout
AnInp1&2X
AnInp1-2x
Word to Bits
WordToBit
ISBus Config
ISBusConfig
Sbi Config
SbiConfig
Dgfc Fast Channels
DgfcFastChCfg
Bits to Word
BitToWord
Dgfc Slow Channels
DgfcSlowChCfg
Saftronics
Proprietary Information
Do Not Copy
PRODUCT:
AD10 AC flux vector Drive
File name:
IO.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01

NAVIGATION
Back
IO

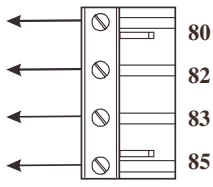
TERMINAL BOARD LAYOUT DRAWING



Strip X1	Function	max
Analog input 1	Programmable/configurable analog differential input. Signal: terminal 1. Reference point: terminal 2. Default setting: Ramp ref 1	±10V 0.25mA (20mA when current loop input)
Analog input 2	Programmable/configurable analog differential input. Signal: terminal 3. Reference point: terminal 4. Default setting: none	
Analog input 3	Programmable/configurable analog differential input. Signal: terminal 5. Reference point: terminal 6. Default setting: none. (1)	
+10V	Reference voltage +10V; Reference point: terminal 9	+10V/10mA
-10V	Reference voltage -10V; Reference point: terminal 9	-10V/10mA
0V	Internal 0V and reference point for±10V	-
Enable/ Digital input 0	Inverter enable, active=high. Concurrently, it can be used as a programmable input. (Default none)	+30V 3.2mA @ 15V 5mA @ 24V 6.4mA @ 30V
Digital input 1	Programmable inputs, Default=none	
Digital input 2		
Digital input 3		
COM D I/O	Reference point for digital inputs and outputs,term.12...15, 36...39, 41...42	-
0 V 24	Reference point for + 24V OUT supply, terminal 19	-
+24V OUT	+24V supply output. Reference point: terminal 18 or 27 or 28	+22 28V 120mA @ 24V

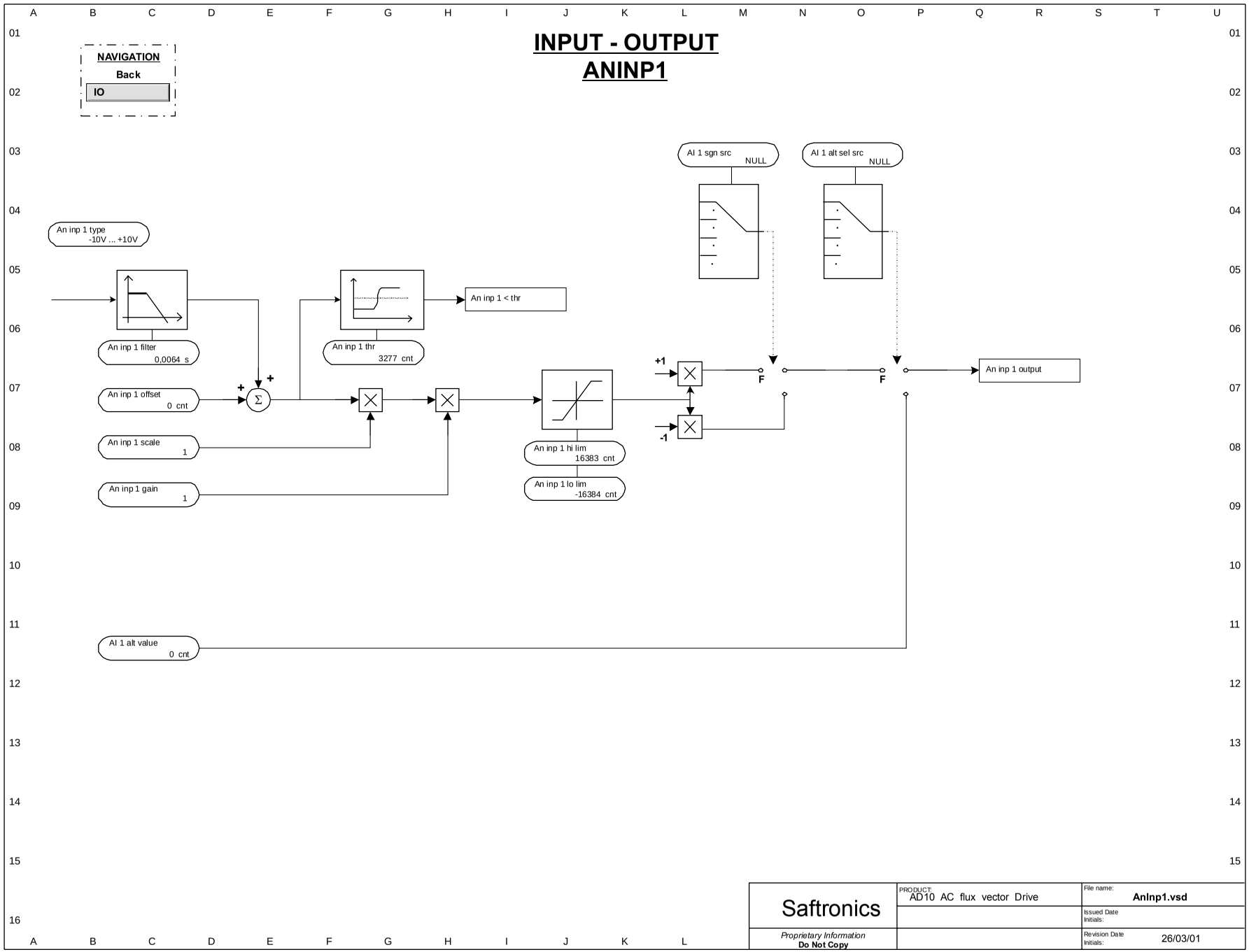


Analog output 1	Program.analog output; def.setting: none	±10V/5mA
0V	Internal 0V and reference point for terminals 21 and 23	-
Analog output 2	Program.analog output; def.setting: none	±10V/5mA
BU comm. output	VeCon controlled BU-32 braking units command. Ref. point: term.27.	+28V/15mA
0 V 24	Reference point for BU-32 command, terminal 26	-
RESERVED		-
RESERVED		
Digital input 4	Programmable digital inputs; default setting: none	+30V 3.2mA @ 15V 5mA @ 24V 6.4mA @ 30V
Digital input 5		
Digital input 6		
Digital input 7		
Digital output 2	Programmable digital outputs; default setting: none	+30V/40mA
Digital output 3		
Supply D O	Supply input for digital outputs on terminals 41/42. Ref. point: term.16.	+30V/80mA
Motor PTC	Motor PTC sensing for overtemperature (cutoff R1k if used)	1.5mA



Strip X2	Function	Max.
Digital output 0 Relay	Potential- free relay contact, programmable output, Default=Drive OK when closed	250V AC 1 A
Digital output 1 Relay	Potential- free relay contact, programmable output, Default=Speed is zero when closed	250V AC 1 A

Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: TB_Layout.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date 26/03/01


INPUT - OUTPUT
ANINP1
NAVIGATION
Back
IO
AI 1 sgn src
NULL
AI 1 alt sel src
NULL
An inp 1 type
-10V ... +10V
An inp 1 filter
0,0064 s
An inp 1 thr
3277 cnt
An inp 1 < thr
An inp 1 offset
0 cnt
An inp 1 scale
1
An inp 1 gain
1
An inp 1 hi lim
16383 cnt
An inp 1 lo lim
-16384 cnt
+1
-1
F
F
An inp 1 output
AI 1 alt value
0 cnt
Saftronics
Proprietary Information
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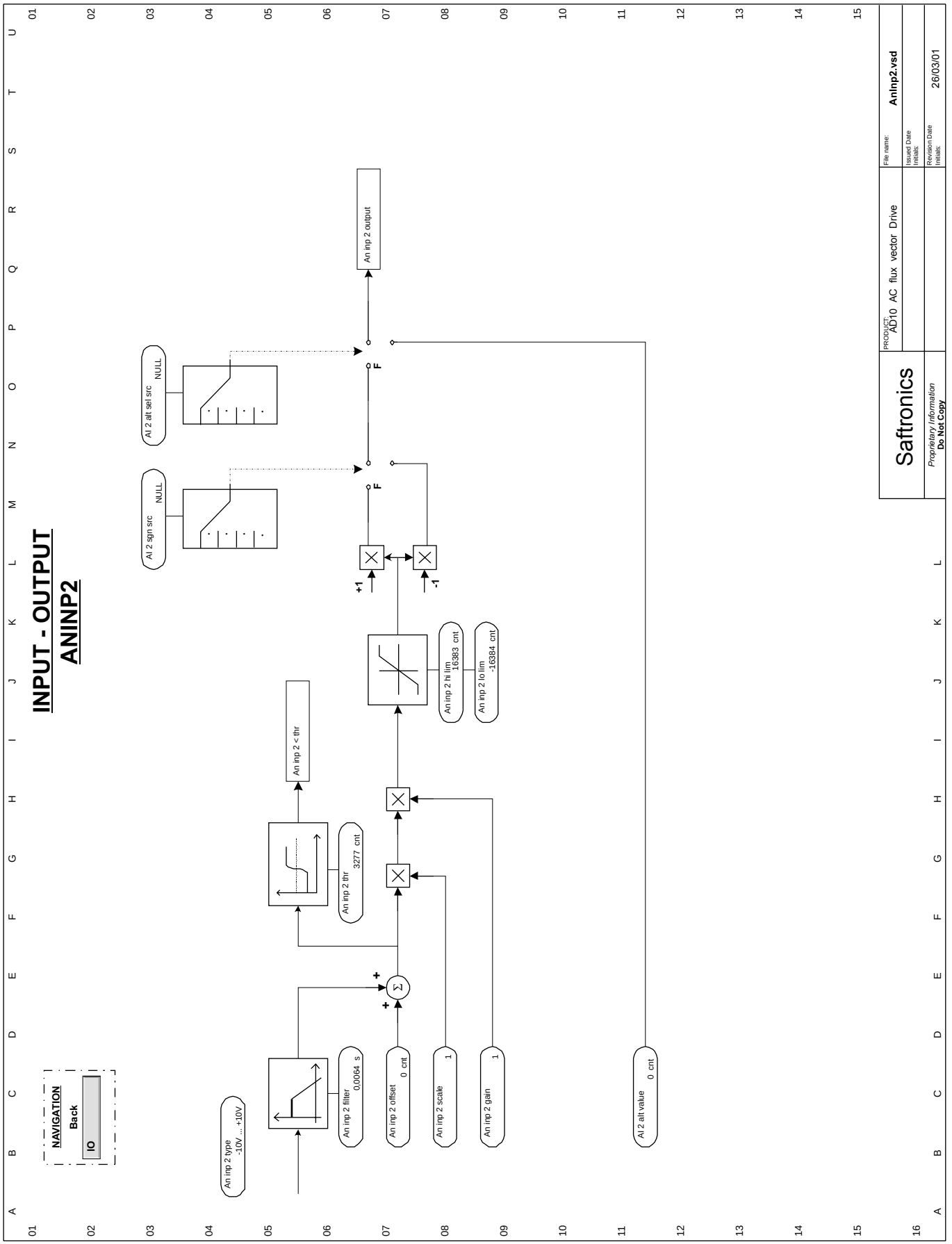
PRODUCT:
AD10 AC flux vector Drive
File name:
AnInp1.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01


INPUT - OUTPUT
ANINP2
NAVIGATION
Back
IO
An inp 2 type -10V ... +10V
An inp 2 filter 0,0064 s
An inp 2 offset 0 cnt
An inp 2 scale 1
An inp 2 gain 1
AI 2 alt value 0 cnt
An inp 2 < thr
An inp 2 thr 3277 cnt
An inp 2 hi lim 16383 cnt
An inp 2 lo lim -16384 cnt
AI 2 sgn src NULL
AI 2 alt sel src NULL
An inp 2 output
+1
-1
F
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: AnInp2.vsd
Issued Date Initials:
Revision Date Initials: 26/03/01
Proprietary Information
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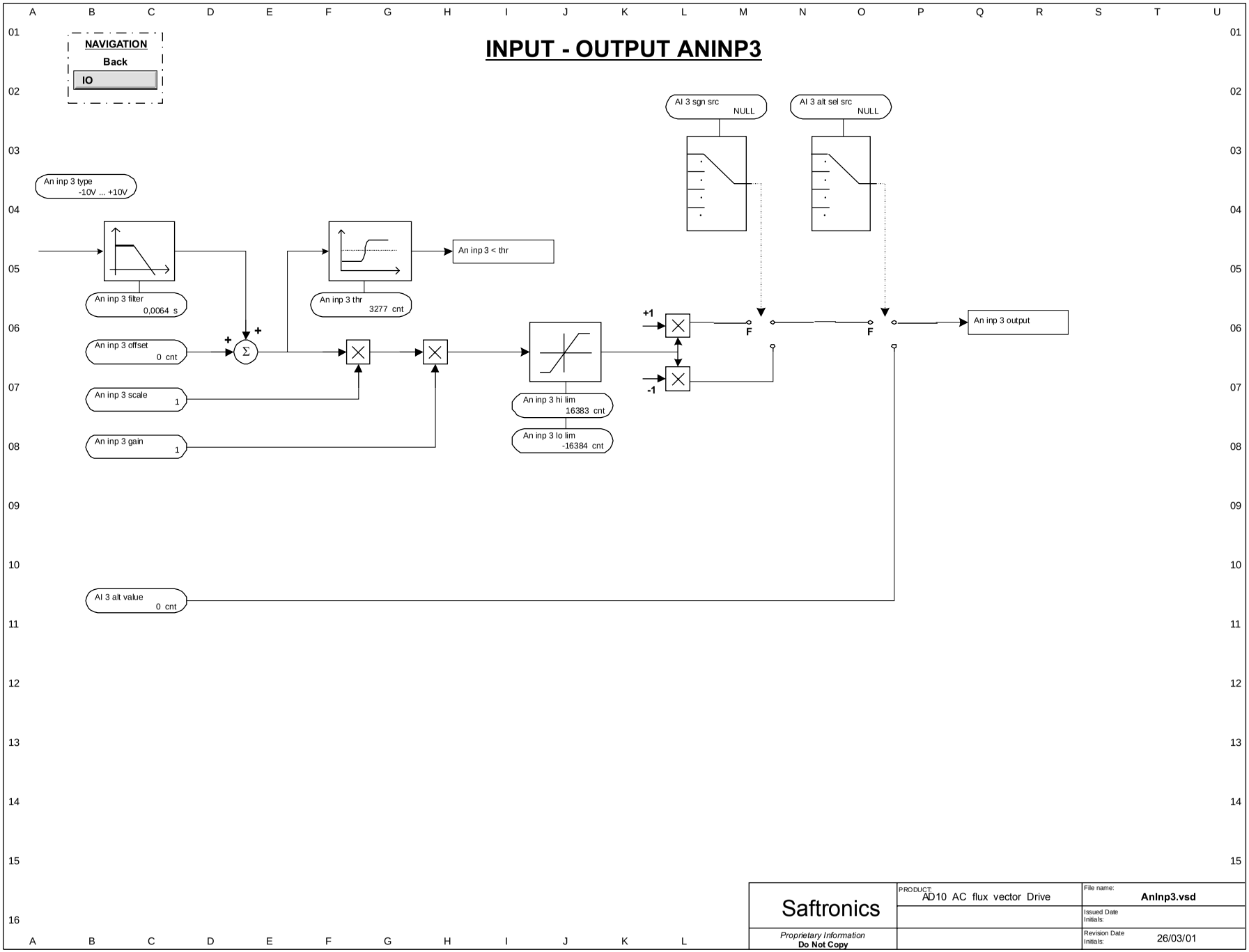
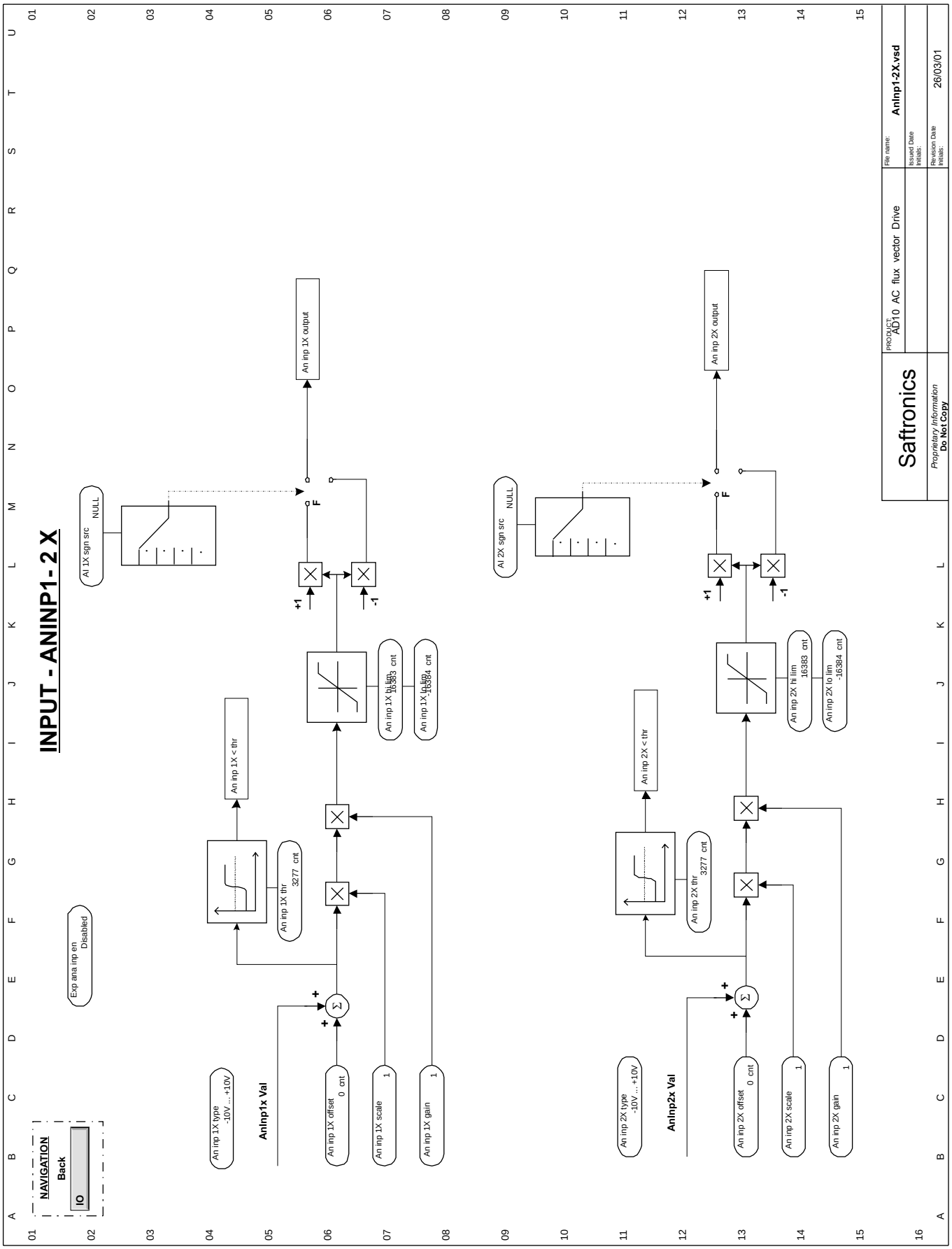
INPUT - OUTPUT ANINP3



Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: **AnInp3.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


INPUT - ANINP1- 2 X
NAVIGATION
Back
IO
Exp ana inp en
Disabled
AI 1X sgn src
NULL
An inp 1X output
An inp 1X type
-10V ... +10V
AnInp1x Val
An inp 1X offset
0 cnt
An inp 1X scale
1
An inp 1X gain
1
An inp 1X < thr
An inp 1X thr
3277 cnt
An inp 1X hi lim
16383 cnt
An inp 1X lo lim
-16384 cnt
AI 2X sgn src
NULL
An inp 2X output
An inp 2X type
-10V ... +10V
AnInp2x Val
An inp 2X offset
0 cnt
An inp 2X scale
1
An inp 2X gain
1
An inp 2X < thr
An inp 2X thr
3277 cnt
An inp 2X hi lim
16383 cnt
An inp 2X lo lim
-16384 cnt
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
AnInp1-2X.vsd
Issued Date
Initials:
Revision Date
Initials:
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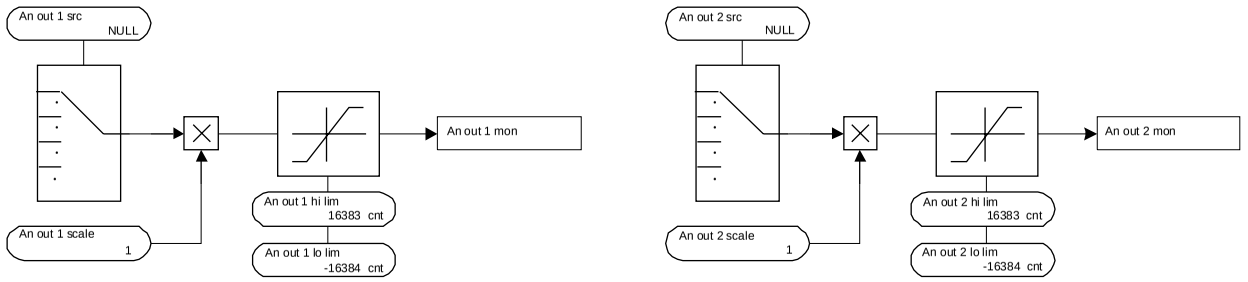
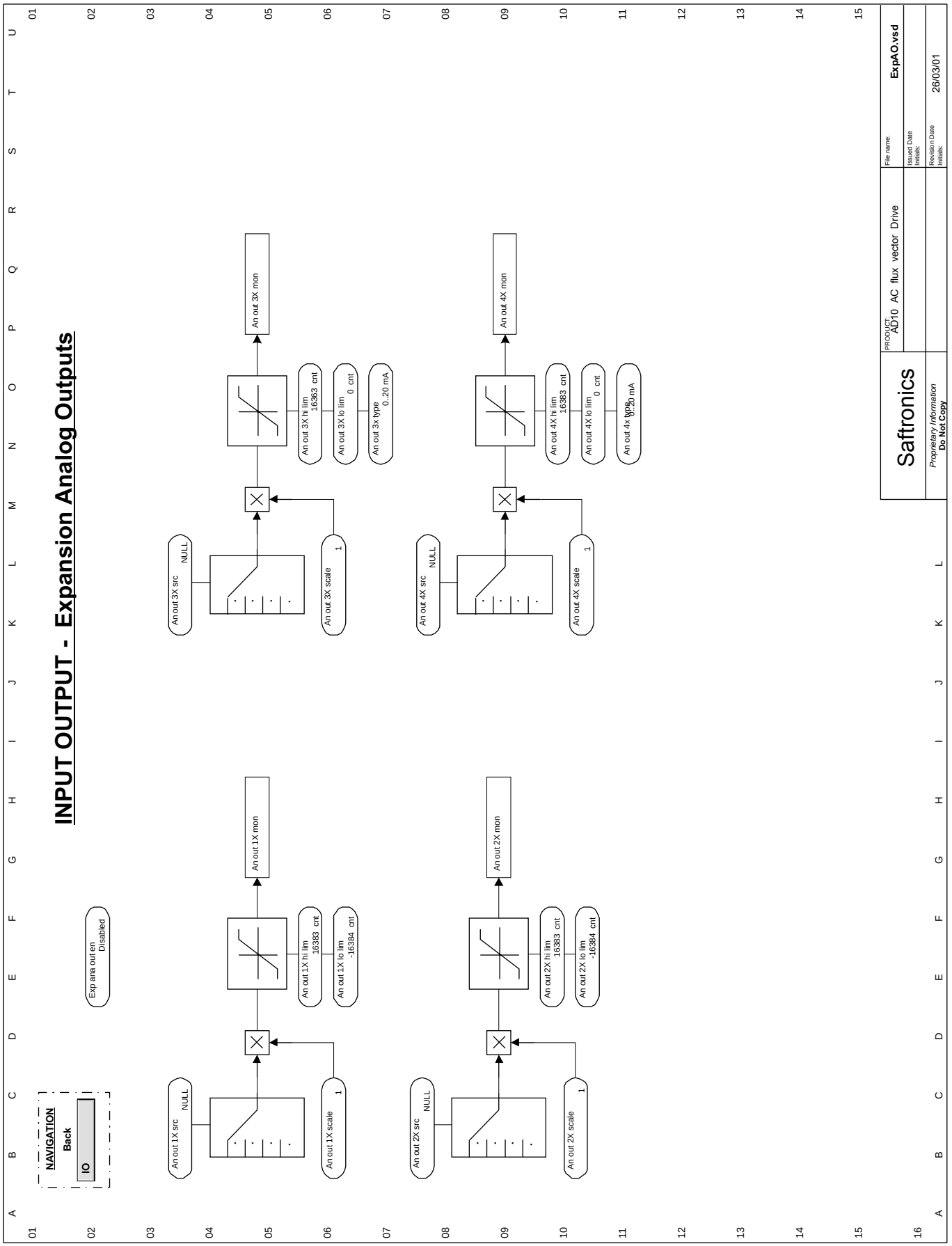
NAVIGATION
Back
IO

INPUT OUTPUT - Standard Analog Outputs



Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: StdAO.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


INPUT OUTPUT - Expansion Analog Outputs
NAVIGATION
Back
IO
Exp ana out en
Disabled
An out 1X src
NULL
An out 1X scale
1
An out 1X hi lim
16383 cnt
An out 1X lo lim
-16384 cnt
An out 1X mon
An out 2X src
NULL
An out 2X scale
1
An out 2X hi lim
16383 cnt
An out 2X lo lim
-16384 cnt
An out 2X mon
An out 3X src
NULL
An out 3X scale
1
An out 3X hi lim
16383 cnt
An out 3X lo lim
0 cnt
An out 3x type
0..20 mA
An out 3X mon
An out 4X src
NULL
An out 4X scale
1
An out 4X hi lim
16383 cnt
An out 4X lo lim
0 cnt
An out 4x type
0..20 mA
An out 4X mon
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
ExpAO.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
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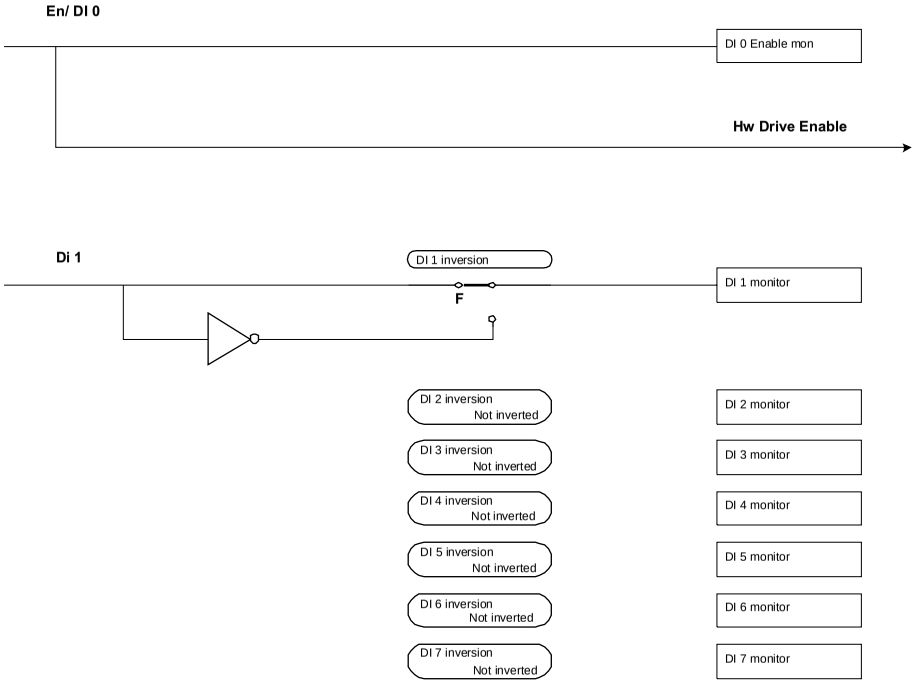
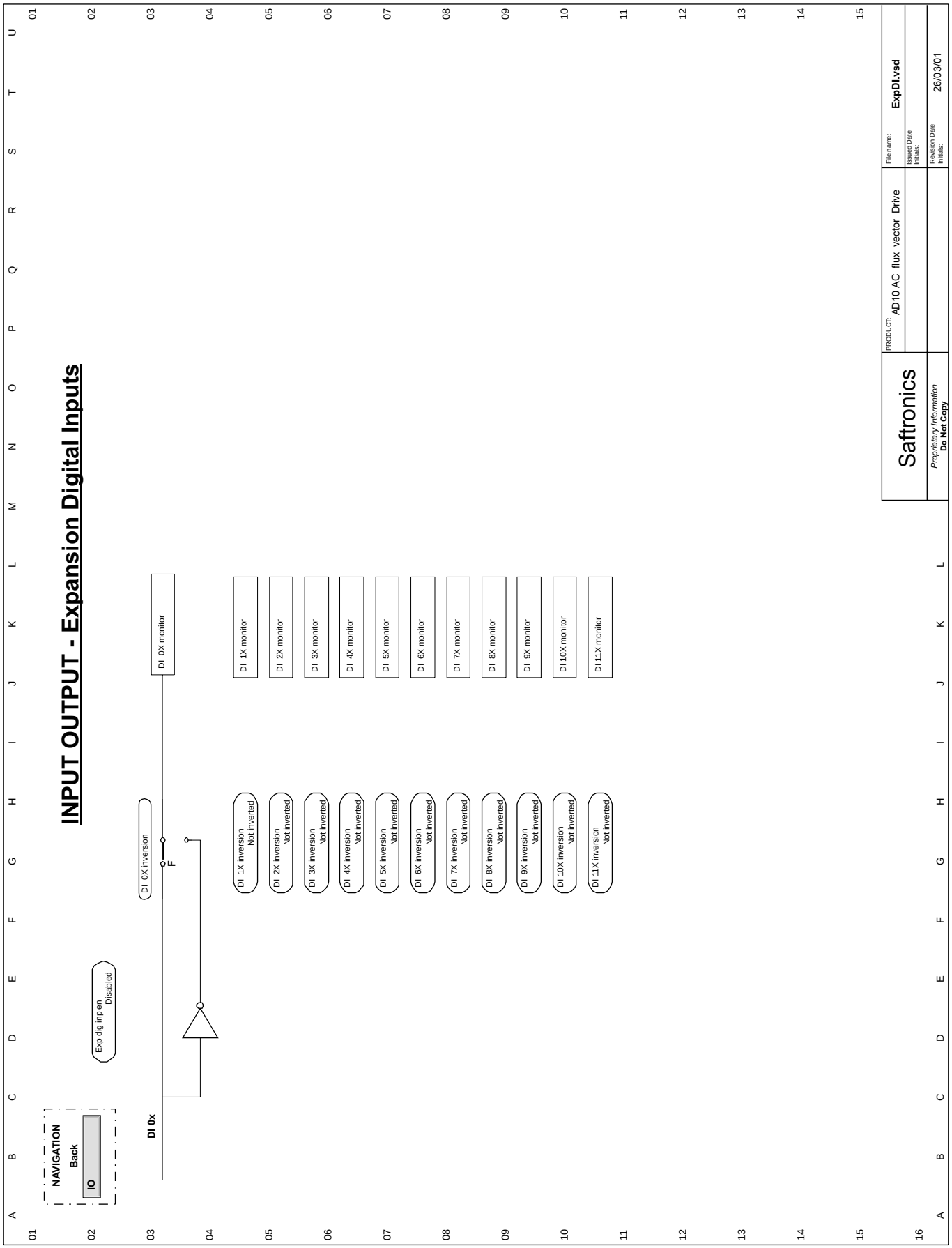
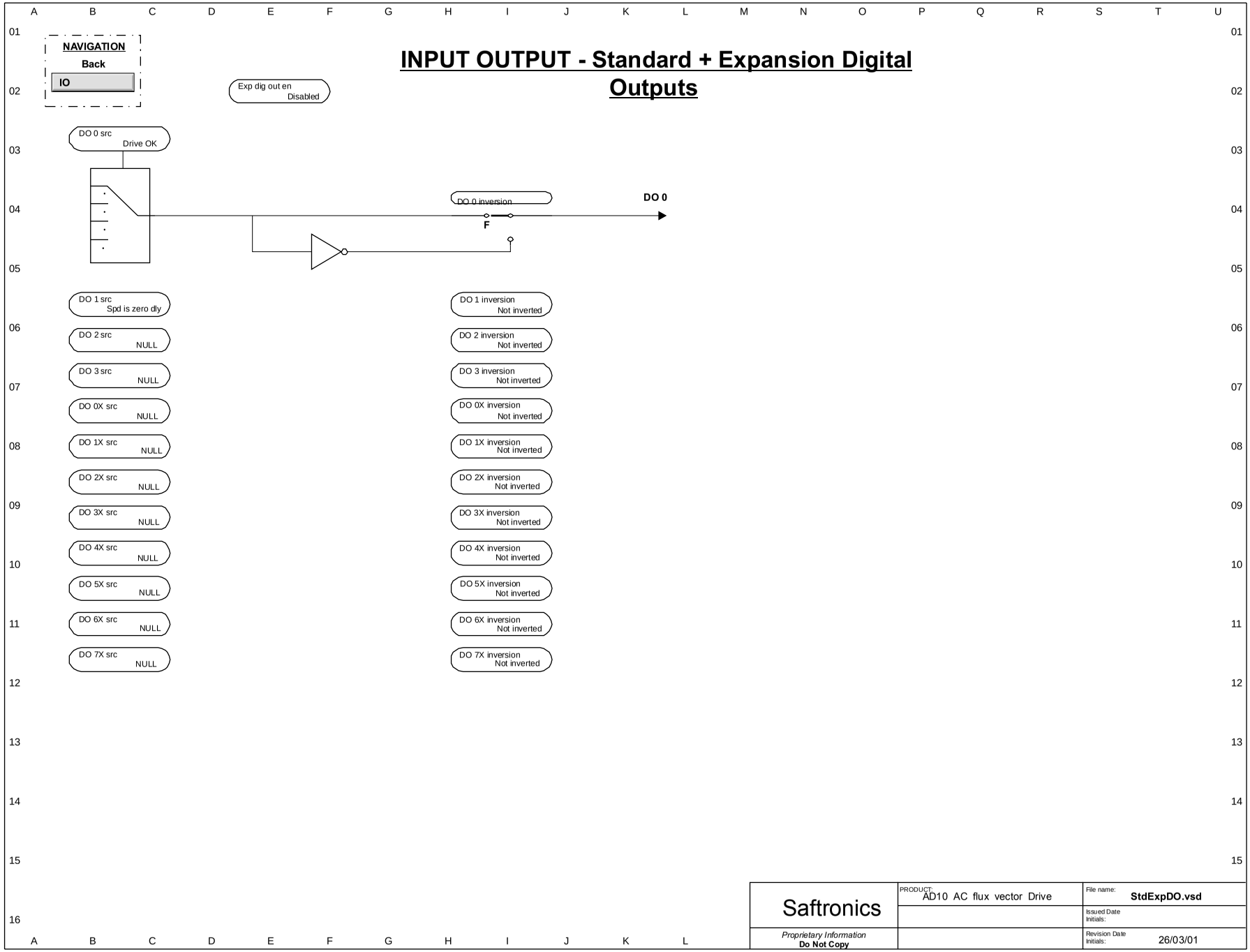
NAVIGATION
Back
IO

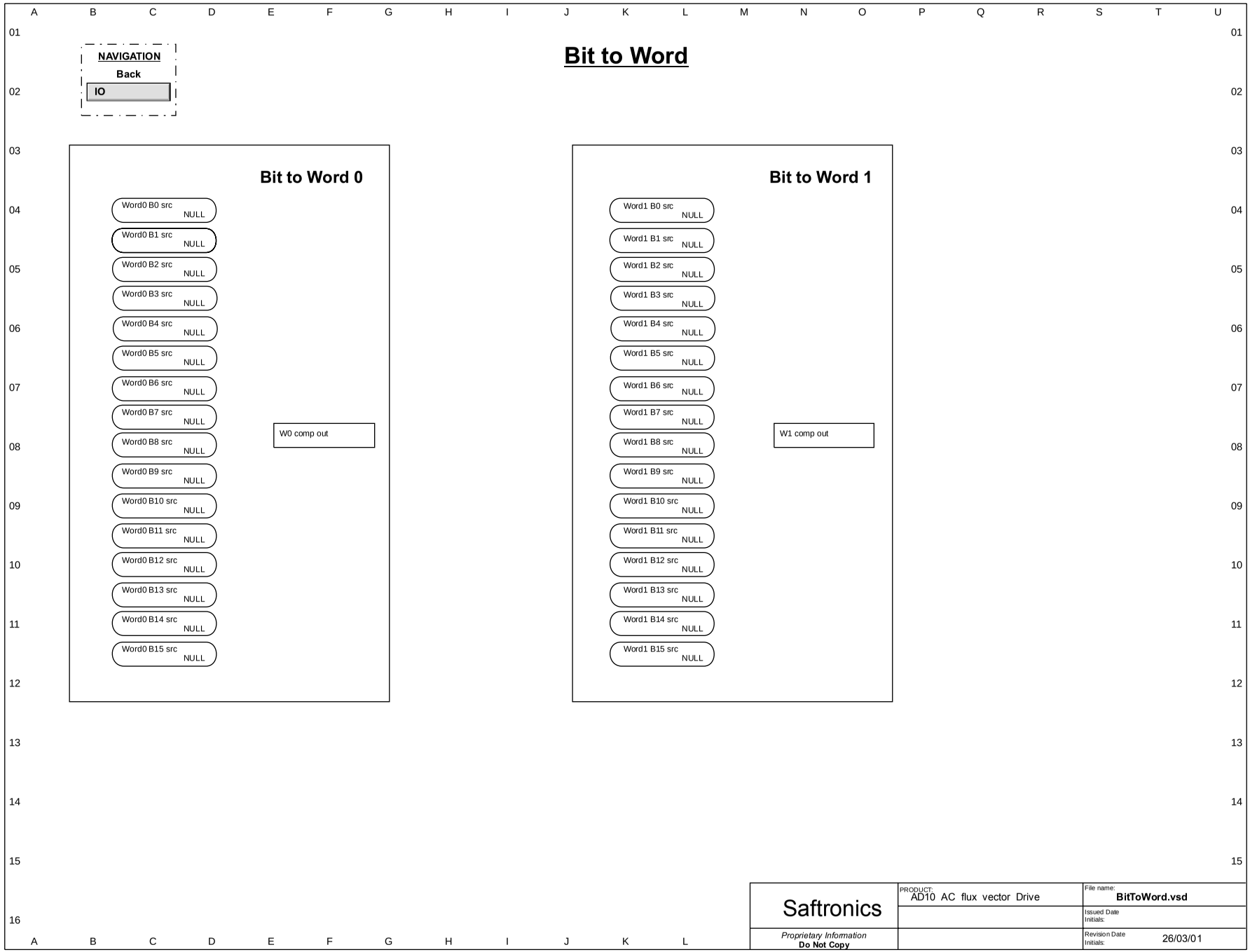
INPUT OUTPUT - Standard Digital Inputs



Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: StdDI.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

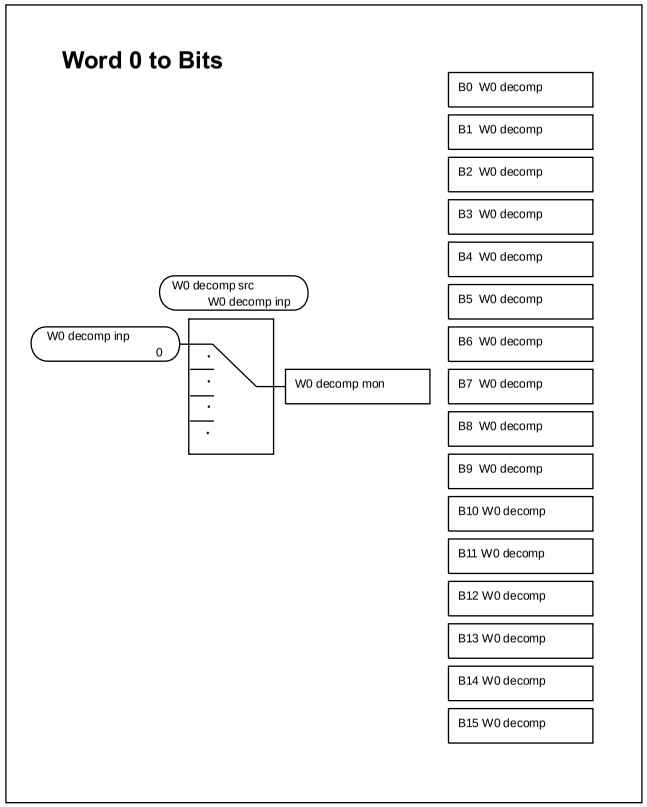

INPUT OUTPUT - Expansion Digital Inputs
NAVIGATION
Back
IO
Exp dig inp en
Disabled
DI 0x
DI 0X inversion
F
DI 0X monitor
DI 1X inversion
Not inverted
DI 2X inversion
Not inverted
DI 3X inversion
Not inverted
DI 4X inversion
Not inverted
DI 5X inversion
Not inverted
DI 6X inversion
Not inverted
DI 7X inversion
Not inverted
DI 8X inversion
Not inverted
DI 9X inversion
Not inverted
DI 10X inversion
Not inverted
DI 11X inversion
Not inverted
DI 1X monitor
DI 2X monitor
DI 3X monitor
DI 4X monitor
DI 5X monitor
DI 6X monitor
DI 7X monitor
DI 8X monitor
DI 9X monitor
DI 10X monitor
DI 11X monitor
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: ExpDI.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
Do Not Copy

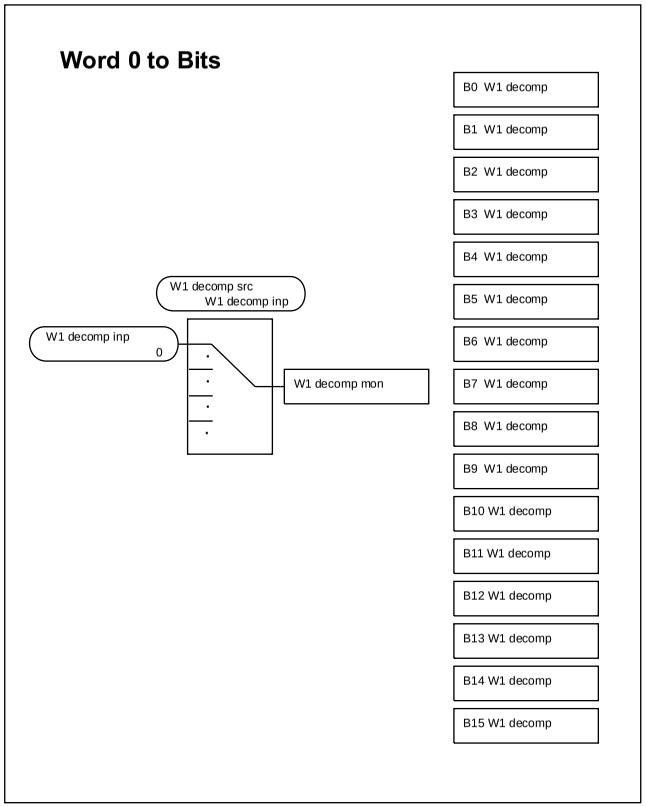

NAVIGATION
Back
IO
INPUT OUTPUT - Standard + Expansion Digital Outputs
Exp dig out en
Disabled
DO 0 src
Drive OK
DO 0 inversion
F
DO 0
DO 1 src
Spd is zero dly
DO 1 inversion
Not inverted
DO 2 src
NULL
DO 2 inversion
Not inverted
DO 3 src
NULL
DO 3 inversion
Not inverted
DO 0X src
NULL
DO 0X inversion
Not inverted
DO 1X src
NULL
DO 1X inversion
Not inverted
DO 2X src
NULL
DO 2X inversion
Not inverted
DO 3X src
NULL
DO 3X inversion
Not inverted
DO 4X src
NULL
DO 4X inversion
Not inverted
DO 5X src
NULL
DO 5X inversion
Not inverted
DO 6X src
NULL
DO 6X inversion
Not inverted
DO 7X src
NULL
DO 7X inversion
Not inverted
Saftronics
Proprietary Information
Do Not Copy
PRODUCT:
AD10 AC flux vector Drive
File name:
StdExpDO.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01


NAVIGATION
Back
IO
Bit to Word
Bit to Word 0
Word0 B0 src NULL
Word0 B1 src NULL
Word0 B2 src NULL
Word0 B3 src NULL
Word0 B4 src NULL
Word0 B5 src NULL
Word0 B6 src NULL
Word0 B7 src NULL
Word0 B8 src NULL
Word0 B9 src NULL
Word0 B10 src NULL
Word0 B11 src NULL
Word0 B12 src NULL
Word0 B13 src NULL
Word0 B14 src NULL
Word0 B15 src NULL
W0 comp out
Bit to Word 1
Word1 B0 src NULL
Word1 B1 src NULL
Word1 B2 src NULL
Word1 B3 src NULL
Word1 B4 src NULL
Word1 B5 src NULL
Word1 B6 src NULL
Word1 B7 src NULL
Word1 B8 src NULL
Word1 B9 src NULL
Word1 B10 src NULL
Word1 B11 src NULL
Word1 B12 src NULL
Word1 B13 src NULL
Word1 B14 src NULL
Word1 B15 src NULL
W1 comp out
Saftronics
Proprietary Information
Do Not Copy
PRODUCT: AD10 AC flux vector Drive
File name: BitToWord.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:

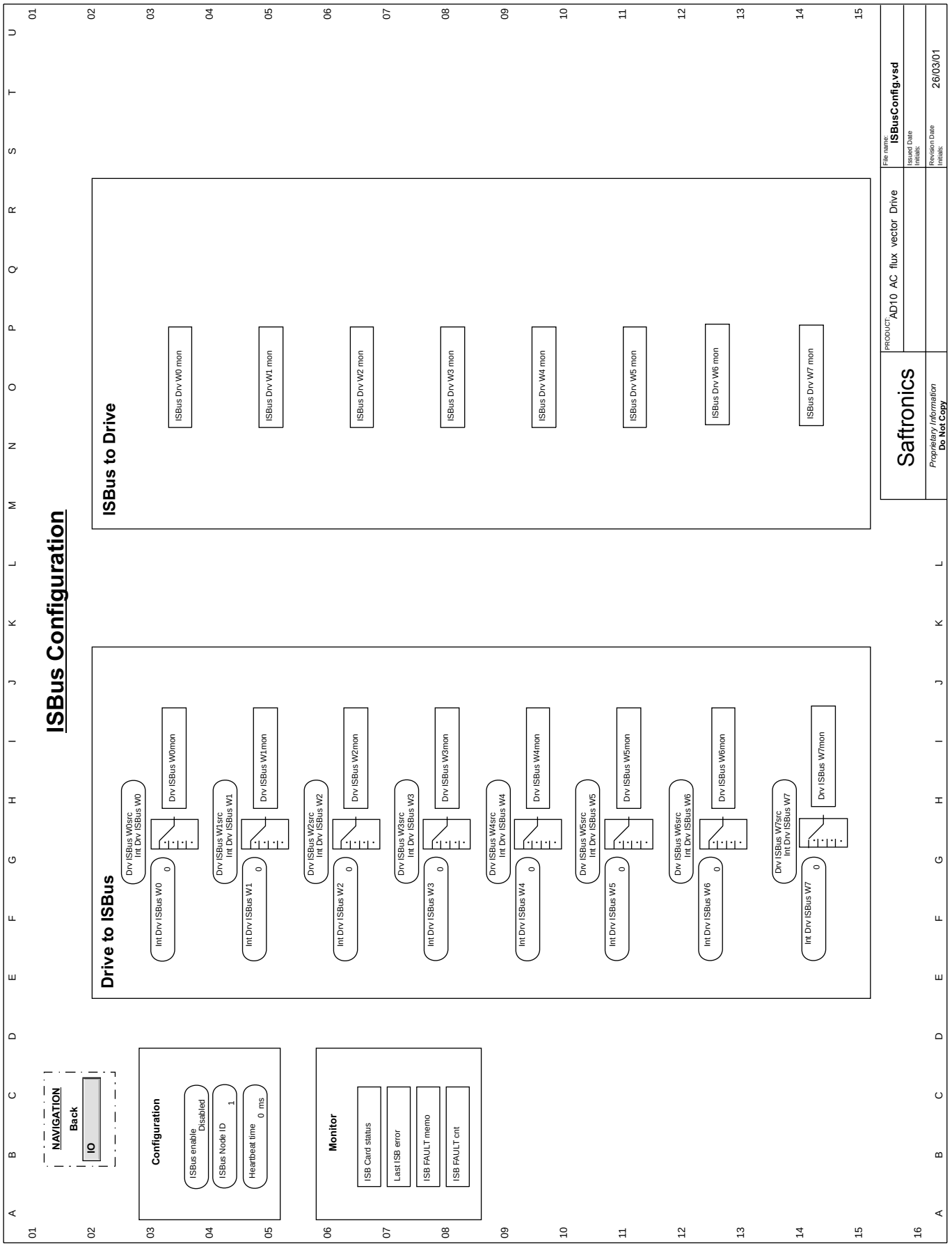
NAVIGATION
Back
IO

Word to Bit





Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: **WordToBit.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


ISBus Configuration
NAVIGATION
Back
IO
Configuration
ISBus enable
Disabled
ISBus Node ID
1
Heartbeat time
0 ms
Monitor
ISB Card status
Last ISB error
ISB FAULT memo
ISB FAULT cnt
Drive to ISBus
Drv ISBus W0src
Int Drv ISBus W0
Int Drv ISBus W0
0
Drv ISBus W0mon
Drv ISBus W1src
Int Drv ISBus W1
Int Drv ISBus W1
0
Drv ISBus W1mon
Drv ISBus W2src
Int Drv ISBus W2
Int Drv ISBus W2
0
Drv ISBus W2mon
Drv ISBus W3src
Int Drv ISBus W3
Int Drv ISBus W3
0
Drv ISBus W3mon
Drv ISBus W4src
Int Drv ISBus W4
Int Drv ISBus W4
0
Drv ISBus W4mon
Drv ISBus W5src
Int Drv ISBus W5
Int Drv ISBus W5
0
Drv ISBus W5mon
Drv ISBus W6src
Int Drv ISBus W6
Int Drv ISBus W6
0
Drv ISBus W6mon
Drv ISBus W7src
Int Drv ISBus W7
Int Drv ISBus W7
0
Drv ISBus W7mon
ISBus to Drive
ISBus Drv W0 mon
ISBus Drv W1 mon
ISBus Drv W2 mon
ISBus Drv W3 mon
ISBus Drv W4 mon
ISBus Drv W5 mon
ISBus Drv W6 mon
ISBus Drv W7 mon
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: ISBusConfig.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy

Sbi Configuration

NAVIGATION
Back
IO

Configuration

SBI enable
Disabled

Monitor

Last SBI error

Drive to Sbi

Drv SBI W0 src
Int Drv SBI W0
Int Drv SBI W0
0
Drv SBI W0 mon

Drv SBI W1 src
Int Drv SBI W1
Int Drv SBI W1
0
Drv SBI W1 mon

Drv SBI W2 src
Int Drv SBI W2
Int Drv SBI W2
0
Drv SBI W2 mon

Drv SBI W3 src
Int Drv SBI W3
Int Drv SBI W3
0
Drv SBI W3 mon

Drv SBI W4 src
Int Drv SBI W4
Int Drv SBI W4
0
Drv SBI W4 mon

Drv SBI W5 src
Int Drv SBI W5
Int Drv SBI W5
0
Drv SBI W5 mon

Sbi to Drive

SBI Drv W0 mon

SBI Drv W1 mon

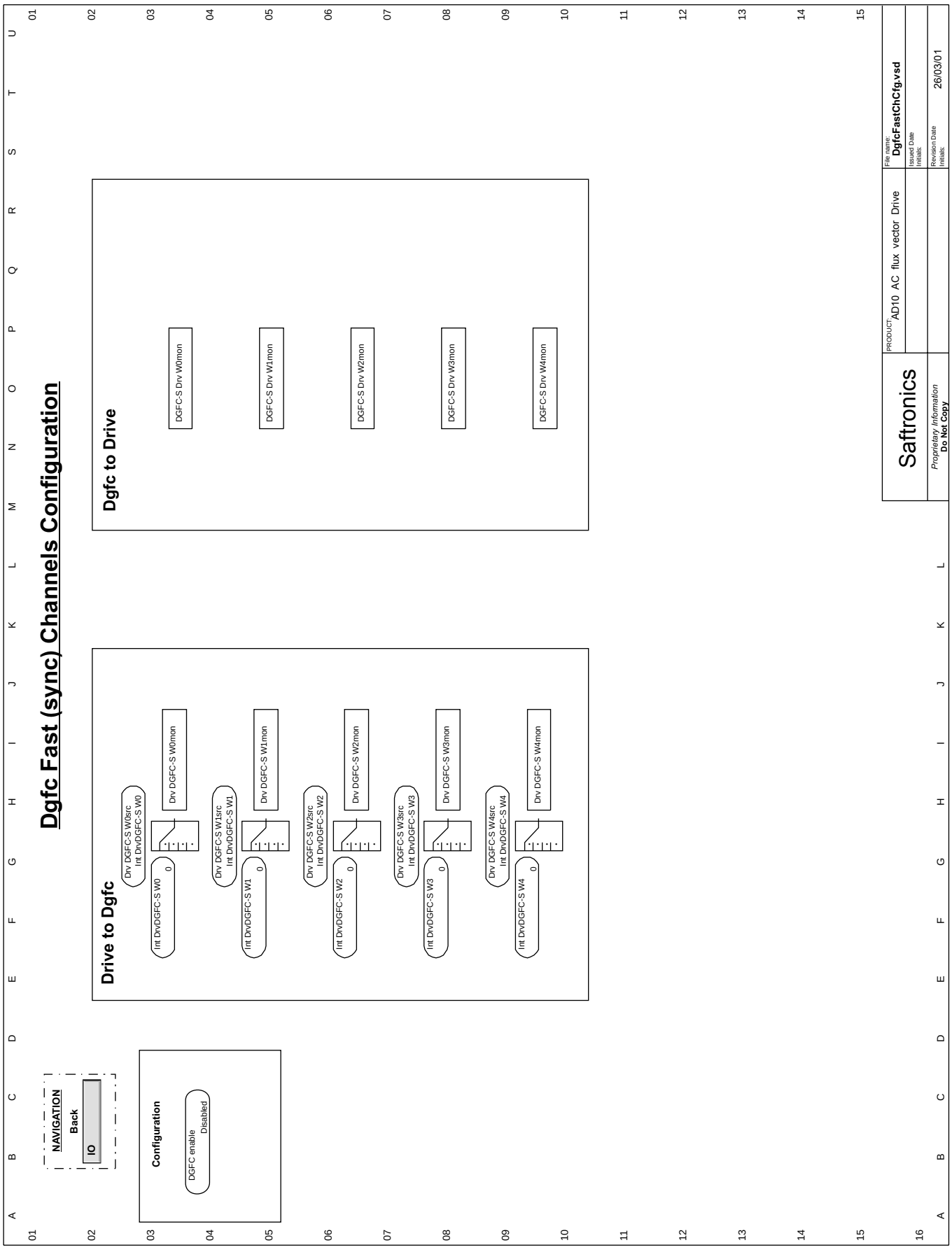
SBI Drv W2 mon

SBI Drv W3 mon

SBI Drv W4 mon

SBI Drv W5 mon

Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: **SbiConfig.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


Dgfc Fast (sync) Channels Configuration
NAVIGATION
Back
IO
Configuration
DGFC enable
Disabled
Drive to Dgfc
Drv DGFC-S W0src
Int DrvDGFC-S W0
Int DrvDGFC-S W0
0
Drv DGFC-S W0mon
Drv DGFC-S W1src
Int DrvDGFC-S W1
Int DrvDGFC-S W1
0
Drv DGFC-S W1mon
Drv DGFC-S W2src
Int DrvDGFC-S W2
Int DrvDGFC-S W2
0
Drv DGFC-S W2mon
Drv DGFC-S W3src
Int DrvDGFC-S W3
Int DrvDGFC-S W3
0
Drv DGFC-S W3mon
Drv DGFC-S W4src
Int DrvDGFC-S W4
Int DrvDGFC-S W4
0
Drv DGFC-S W4mon
Dgfc to Drive
DGFC-S Drv W0mon
DGFC-S Drv W1mon
DGFC-S Drv W2mon
DGFC-S Drv W3mon
DGFC-S Drv W4mon
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: DgfcFastChCfg.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
Do Not Copy

Dgfc Slow (async) Channels Configuration

NAVIGATION
Back
IO

Configuration

DGFC enable
Disabled

Drive to Dgfc

Drv DGFC-A W0src
Int DrvDGFC-A W0
Int DrvDGFC-A W0
0
Drv DGFC-A W0mon

Drv DGFC-A W1src
Int DrvDGFC-A W1
Int DrvDGFC-A W1
0
Drv DGFC-A W1mon

Drv DGFC-A W2src
Int DrvDGFC-A W2
Int DrvDGFC-A W2
0
Drv DGFC-A W2mon

Drv DGFC-A W3src
Int DrvDGFC-A W3
Int DrvDGFC-A W3
0
Drv DGFC-A W3mon

Drv DGFC-A W4src
Int DrvDGFC-A W4
Int DrvDGFC-A W4
0
Drv DGFC-A W4mon

Drv DGFC-A W5src
Int DrvDGFC-A W5
Int DrvDGFC-A W5
0
Drv DGFC-A W5mon

Drv DGFC-A W6src
Int DrvDGFC-A W6
Int DrvDGFC-A W6
0
Drv DGFC-A W6mon

Drv DGFC-A W7src
Int DrvDGFC-A W7
Int DrvDGFC-A W7
0
Drv DGFC-A W7mon

Drv DGFC-A W8src
Int DrvDGFC-A W8
Int DrvDGFC-A W8
0
Drv DGFC-A W8mon

Drv DGFC-A W9src
Int DrvDGFC-A W9
Int DrvDGFC-A W9
0
Drv DGFC-A W9mon

Dgfc to Drive

DGFC-A Drv W0mon
DGFC-A Drv W1mon
DGFC-A Drv W2mon
DGFC-A Drv W3mon
DGFC-A Drv W4mon
DGFC-A Drv W5mon
DGFC-A Drv W6mon
DGFC-A Drv W7mon
DGFC-A Drv W8mon
DGFC-A Drv W9mon

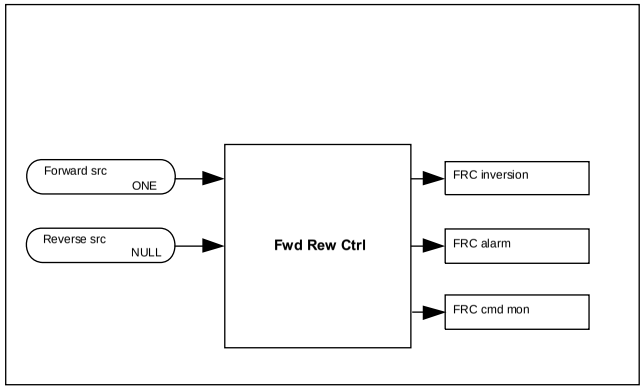
Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: DgfcSlowChCfg.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

NAVIGATION

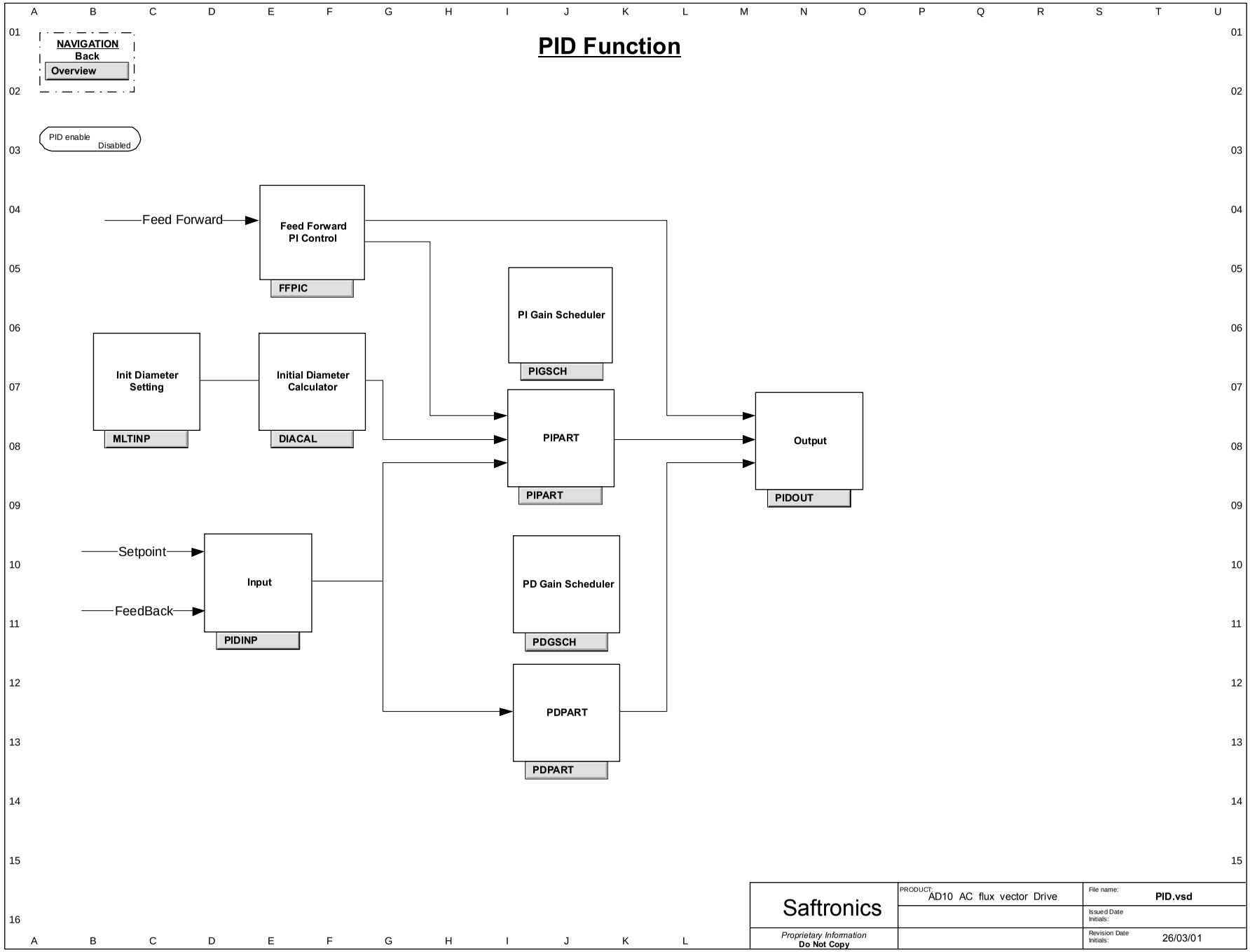
Back

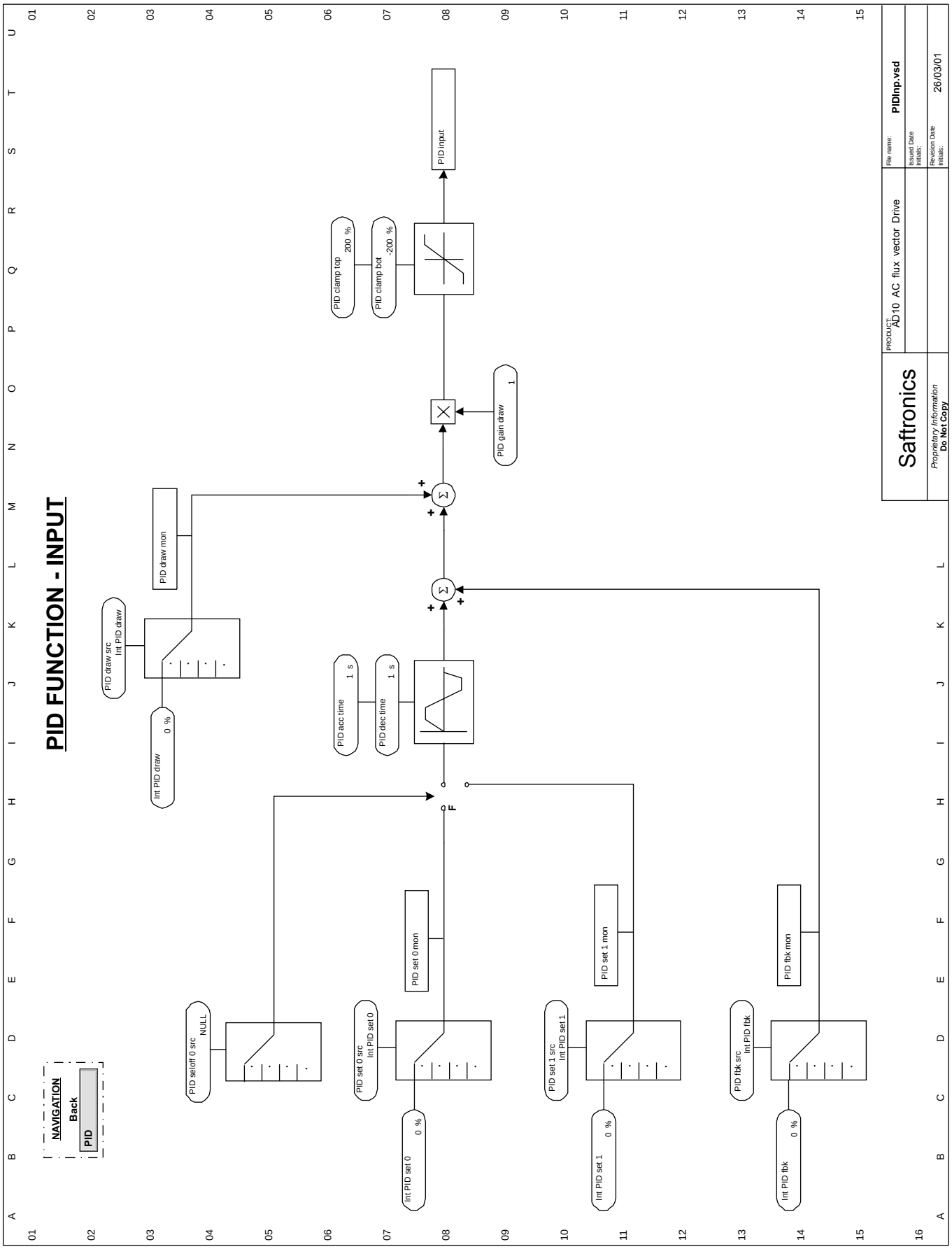
IO

FORWARD REVERSE CONTROL BLOCK

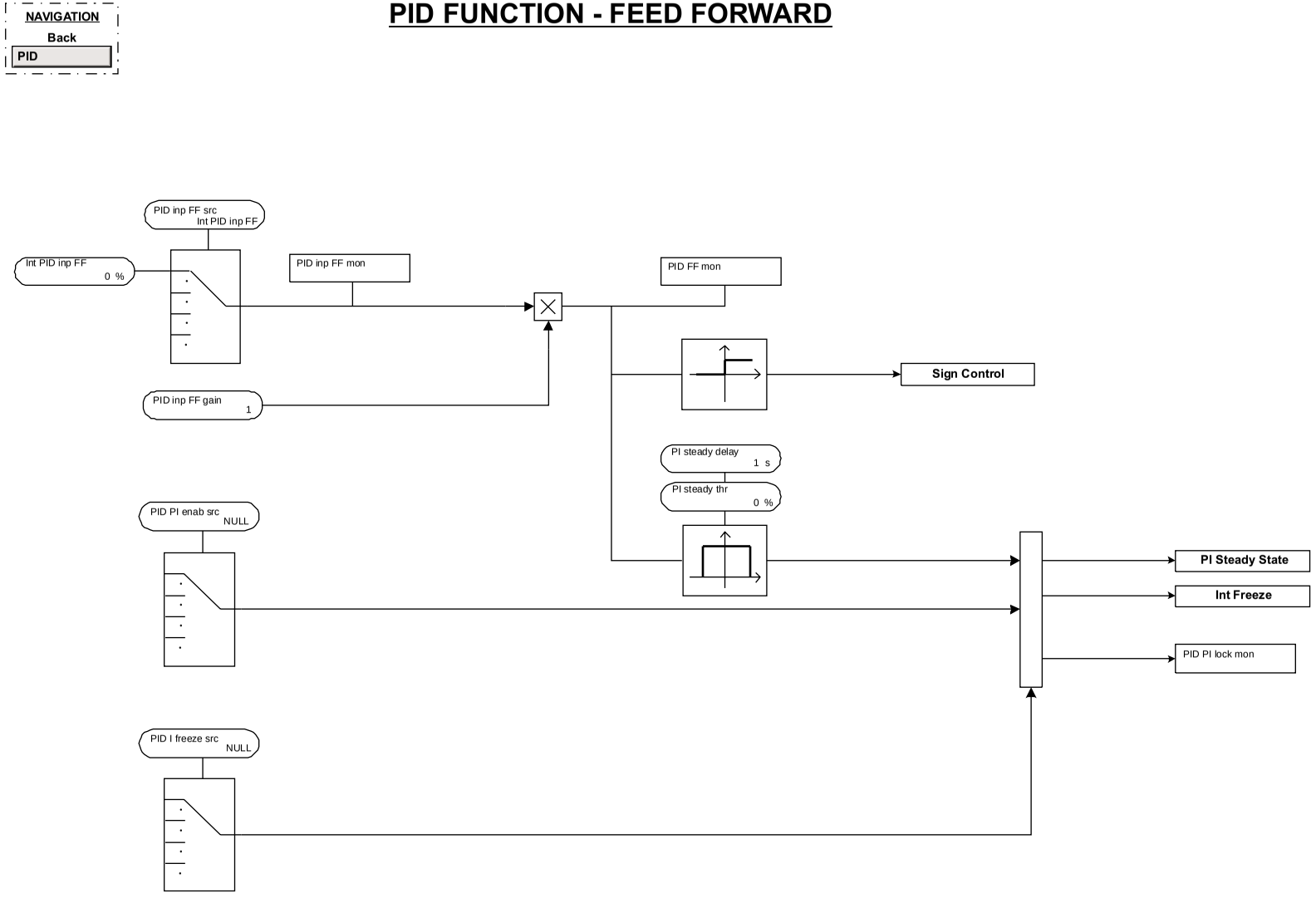


Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: Frc.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

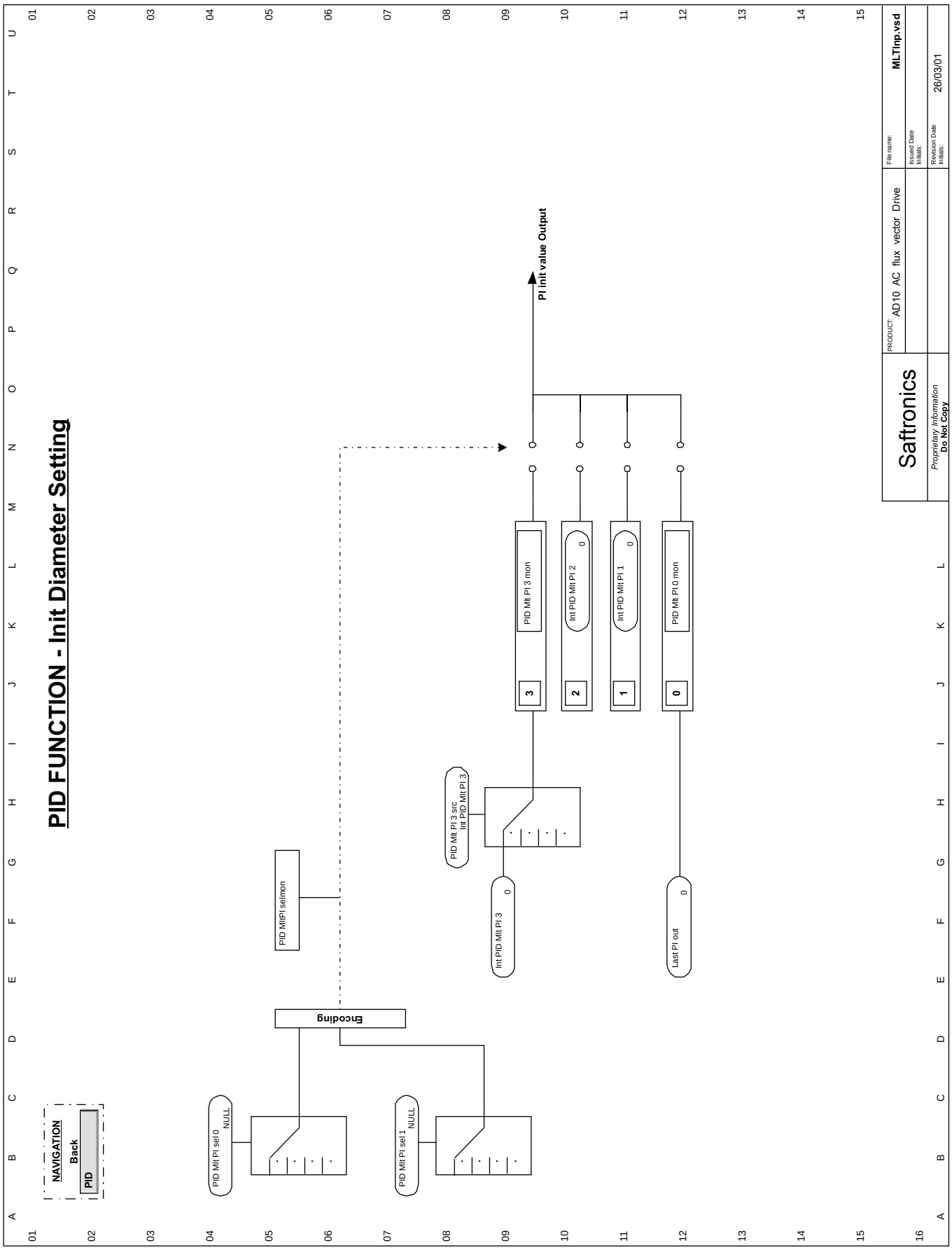

PID Function
NAVIGATION
Back
Overview
PID enable
Disabled
Feed Forward
Feed Forward PI Control
FFPIC
PI Gain Scheduler
PIGSCH
Init Diameter Setting
MLTINP
Initial Diameter Calculator
DIACAL
PIPART
PIPART
Output
PIDOUT
Setpoint
FeedBack
Input
PIDINP
PD Gain Scheduler
PDGSCH
PDPART
PDPART
Saftronics
Proprietary Information
Do Not Copy
PRODUCT:
AD10 AC flux vector Drive
File name:
PID.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01


PID FUNCTION - INPUT
NAVIGATION
Back
PID
PID seloff 0 src
NULL
PID set 0 src
Int PID set 0
PID set 1 src
Int PID set 1
PID fbk src
Int PID fbk
PID draw src
Int PID draw
Int PID draw
0 %
Int PID set 0
0 %
Int PID set 1
0 %
Int PID fbk
0 %
PID set 0 mon
PID set 1 mon
PID fbk mon
PID draw mon
PID acc time
1 s
PID dec time
1 s
PID clamp top
200 %
PID clamp bot
-200 %
PID gain draw
1
PID input
F
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
PIDInp.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy

PID FUNCTION - FEED FORWARD

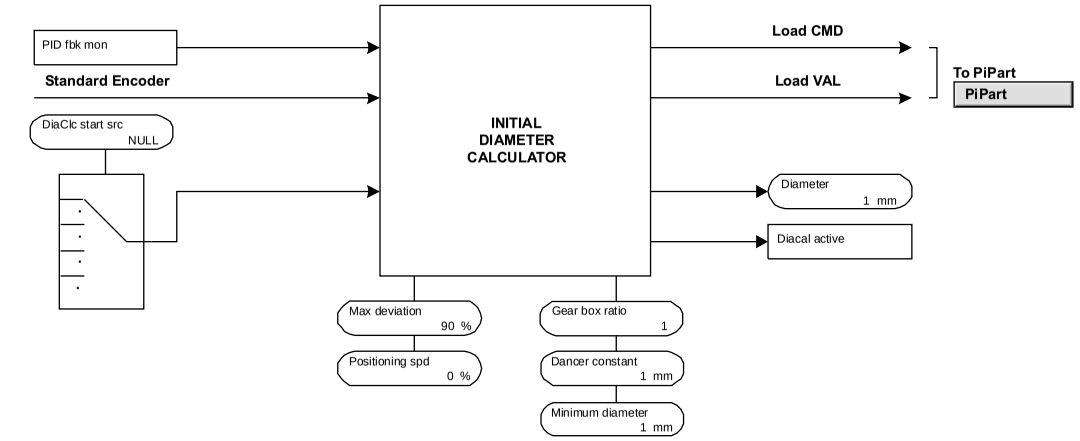


Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: FfPic.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

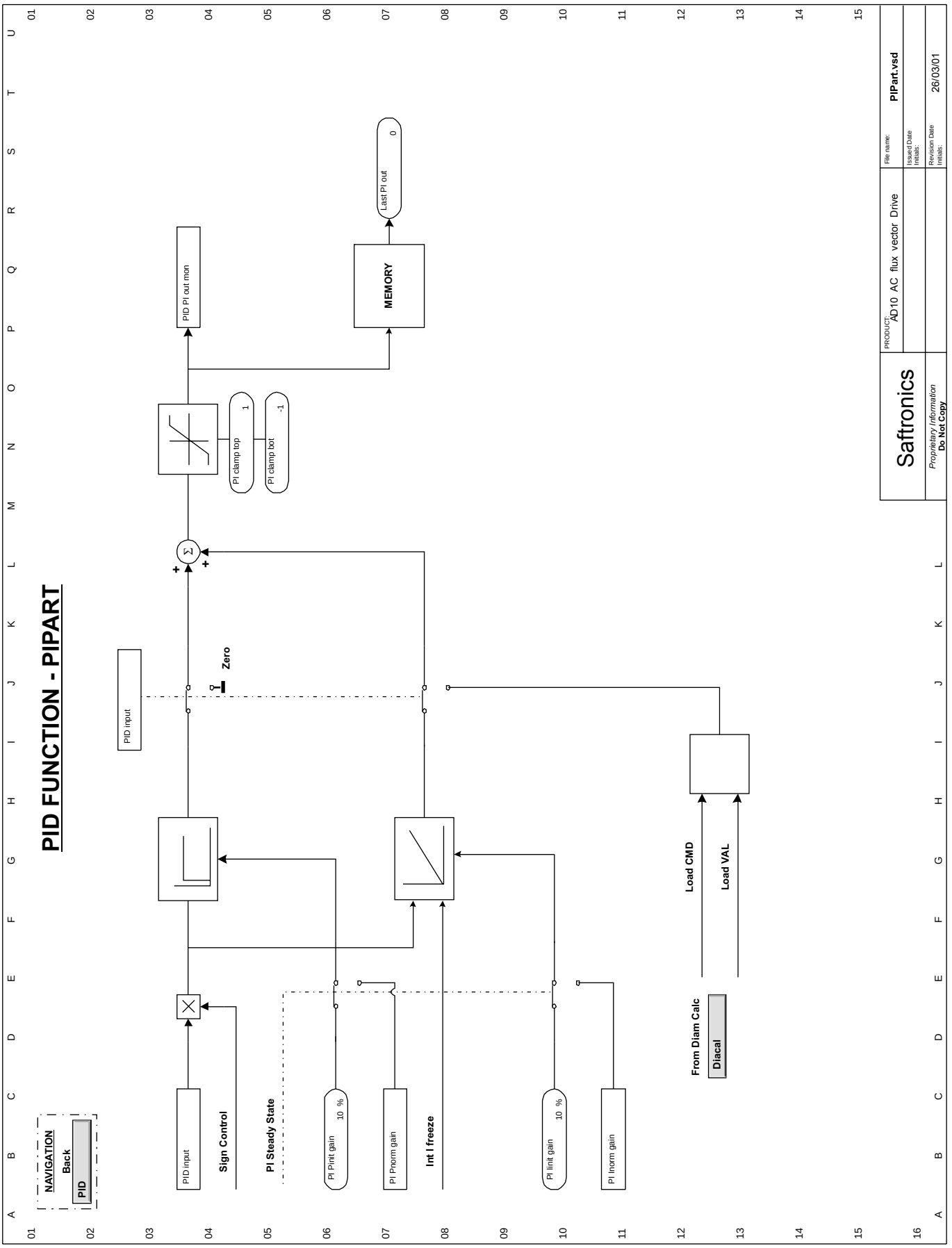

PID FUNCTION - Init Diameter Setting
NAVIGATION
Back
PID
PID Mlt PI sel 0
NULL
PID Mlt PI sel 1
NULL
Encoding
PID MltPI selmon
PID Mlt PI 3 src
Int PID Mlt PI 3
Int PID Mlt PI 3
0
Last PI out
0
PI init value Output
3
PID Mlt PI 3 mon
2
Int PID Mlt PI 2
0
1
Int PID Mlt PI 1
0
0
PID Mlt PI 0 mon
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: MLTInp.vsd
Issued Date
Initials:
Revision Date 26/03/01
Initials:
Proprietary Information
Do Not Copy

NAVIGATION
Back
PID

PID FUNCTION - Initial Diameter Calculator

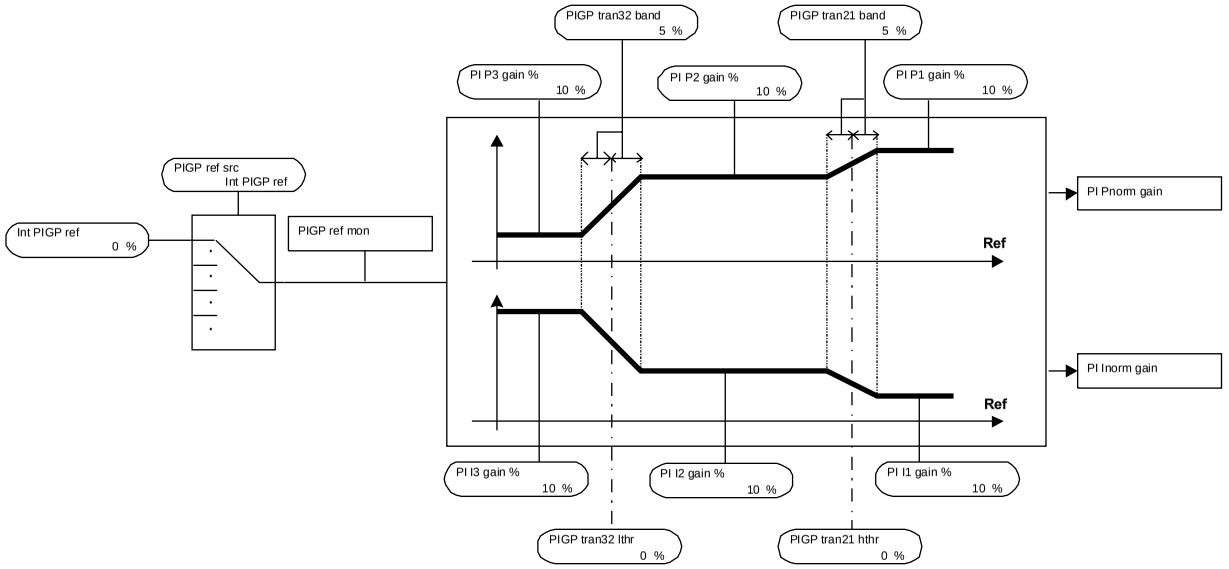


Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: **Diacal.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

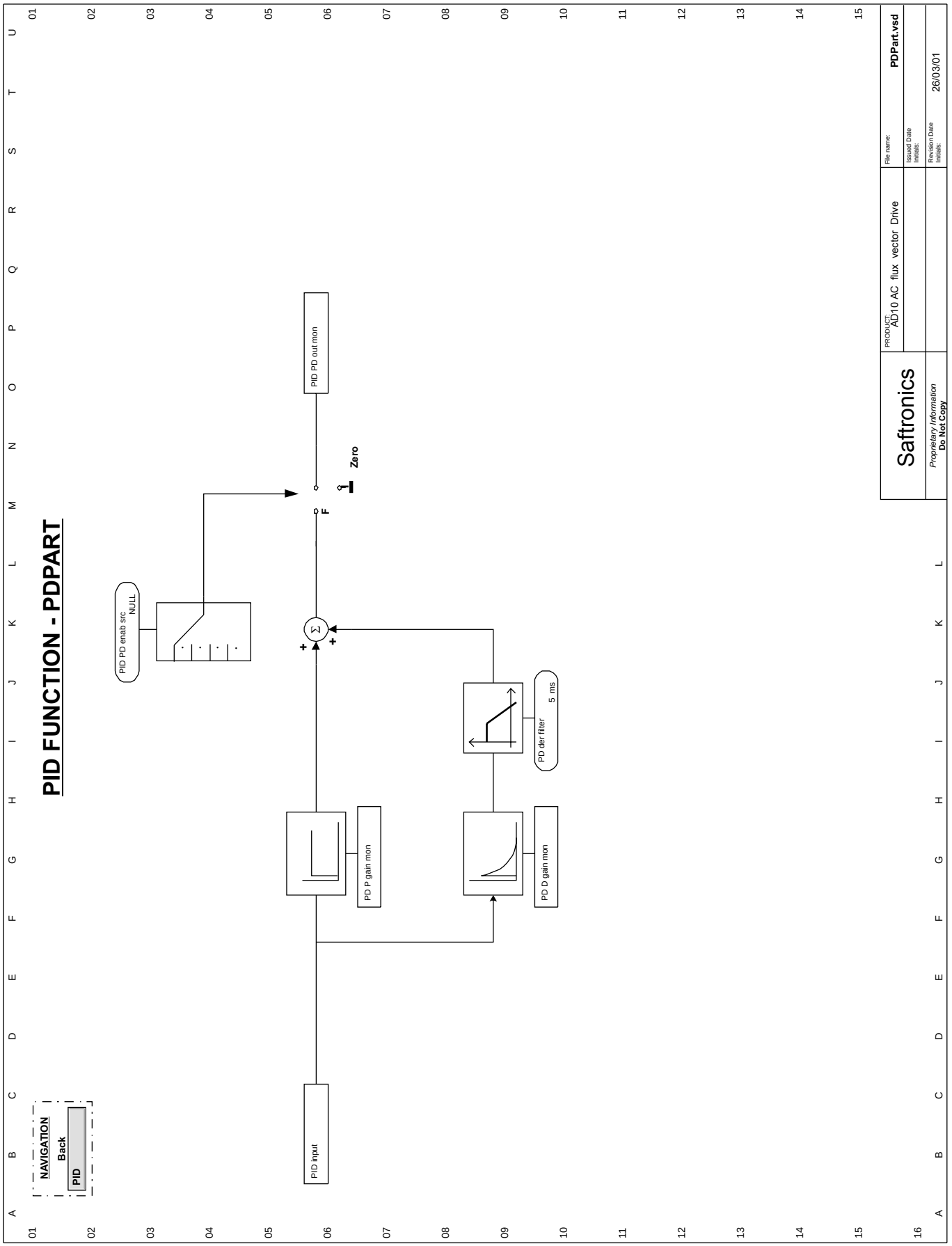

PID FUNCTION - PIPART
NAVIGATION
Back
PID
PID input
Sign Control
PI Steady State
PI Pinit gain
10 %
PI Pnorm gain
Int I freeze
PI Iinit gain
10 %
PI Inorm gain
From Diam Calc
Diacal
Load CMD
Load VAL
PID input
Zero
PI clamp top
1
PI clamp bot
-1
PID PI out mon
MEMORY
Last PI out
0
Saftronics
PRODUCT:
AD10 AC flux vector Drive
File name:
PIPart.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy

PID FUNCTION - PI GAIN SCHEDULER

NAVIGATION
Back
PID

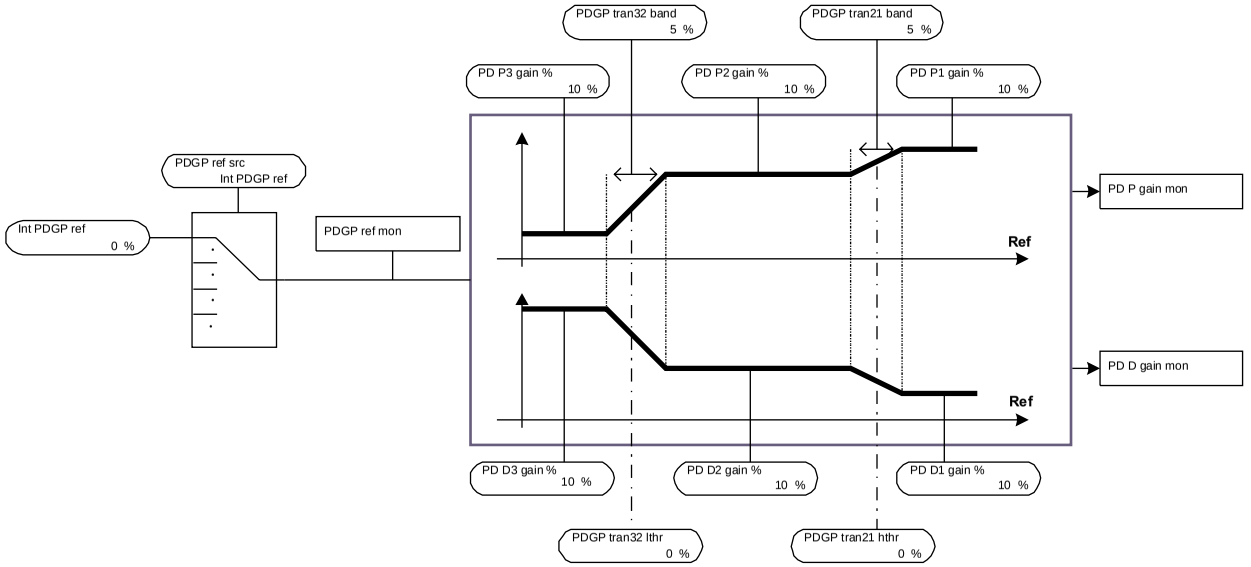


Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: PIGsch.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01

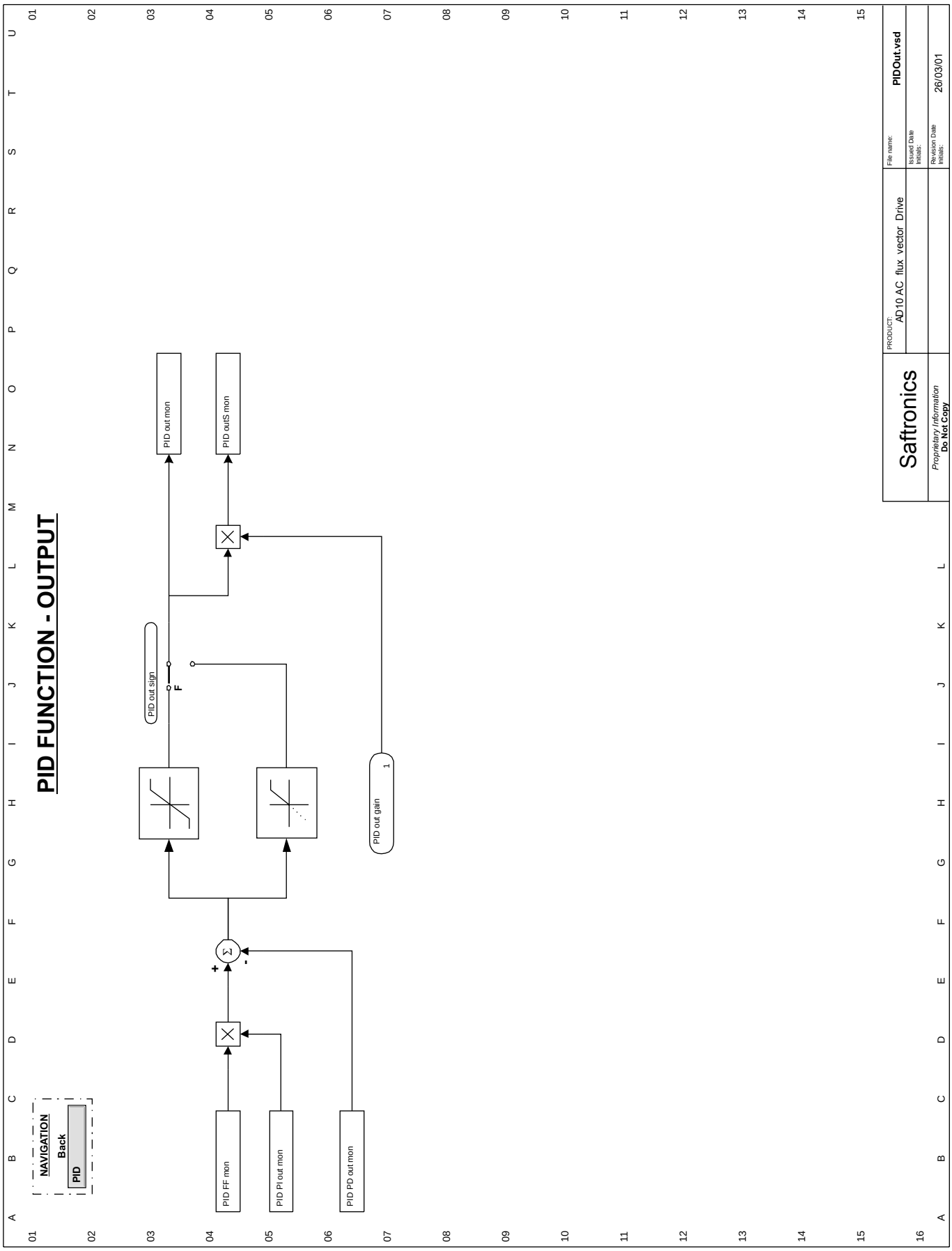

PID FUNCTION - PDPART
NAVIGATION
Back
PID
PID input
PD P gain mon
PD D gain mon
PD der filter
5 ms
PID PD enab src
NULL
Σ
+
+
F
Zero
PID PD out mon
Saftronics
PRODUCT
AD10 AC flux vector Drive
File name:
PDPart.vsd
Issued Date
Initials:
Revision Date
Initials:
26/03/01
Proprietary Information
Do Not Copy

NAVIGATION
Back
PID

PID FUNCTION - PD GAIN SCHEDULER

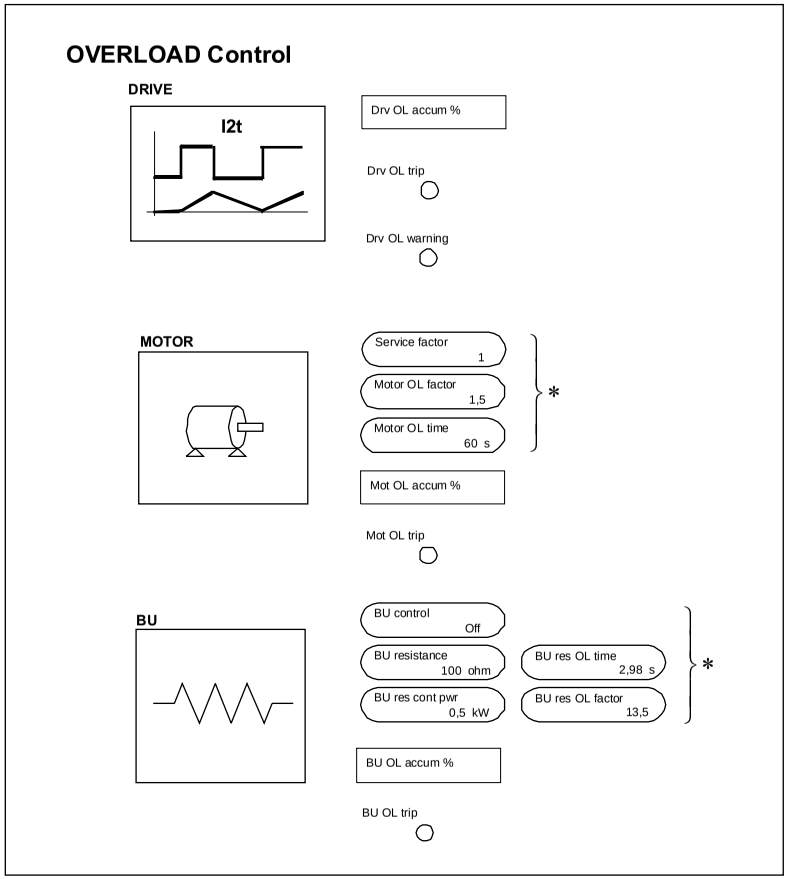


Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: **PDGsch.vsd**
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date Initials: 26/03/01


PID FUNCTION - OUTPUT
NAVIGATION
Back
PID
PID FF mon
PID PI out mon
PID PD out mon
PID out sign
PID out mon
PID outS mon
PID out gain
Saftronics
PRODUCT: AD10 AC flux vector Drive
File name: PIDOut.vsd
Issued Date Initials:
Revision Date Initials: 26/03/01
Proprietary Information Do Not Copy

NAVIGATION
Back
Overview

OVERLOAD SETTINGS



* marked parameter belong to STARTUP menu, do not modify them in this page

Saftronics	PRODUCT: AD10 AC flux vector Drive	File name: Overload.vsd
		Issued Date Initials:
Proprietary Information **Do Not Copy**		Revision Date 26/03/01

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IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 648 FT. MYERS, FL

POSTAGE WILL BE PAID BY ADDRESSEE

SAFTRONICS INC
WARRANTY DEPARTMENT
5580 ENTERPRISE PKWY
FORT MYERS FL 33905-9977

Warranty Registration

(keep copy for your records)

Company Name _____

Address _____

_____

_____

_____

Phone _____

Fax _____

Your Name _____

Title _____

E-Mail _____

Start-Up Date _____

Bought From _____

Application _____

_____

_____

Comments _____

_____

❑ Omit my name from mailing list

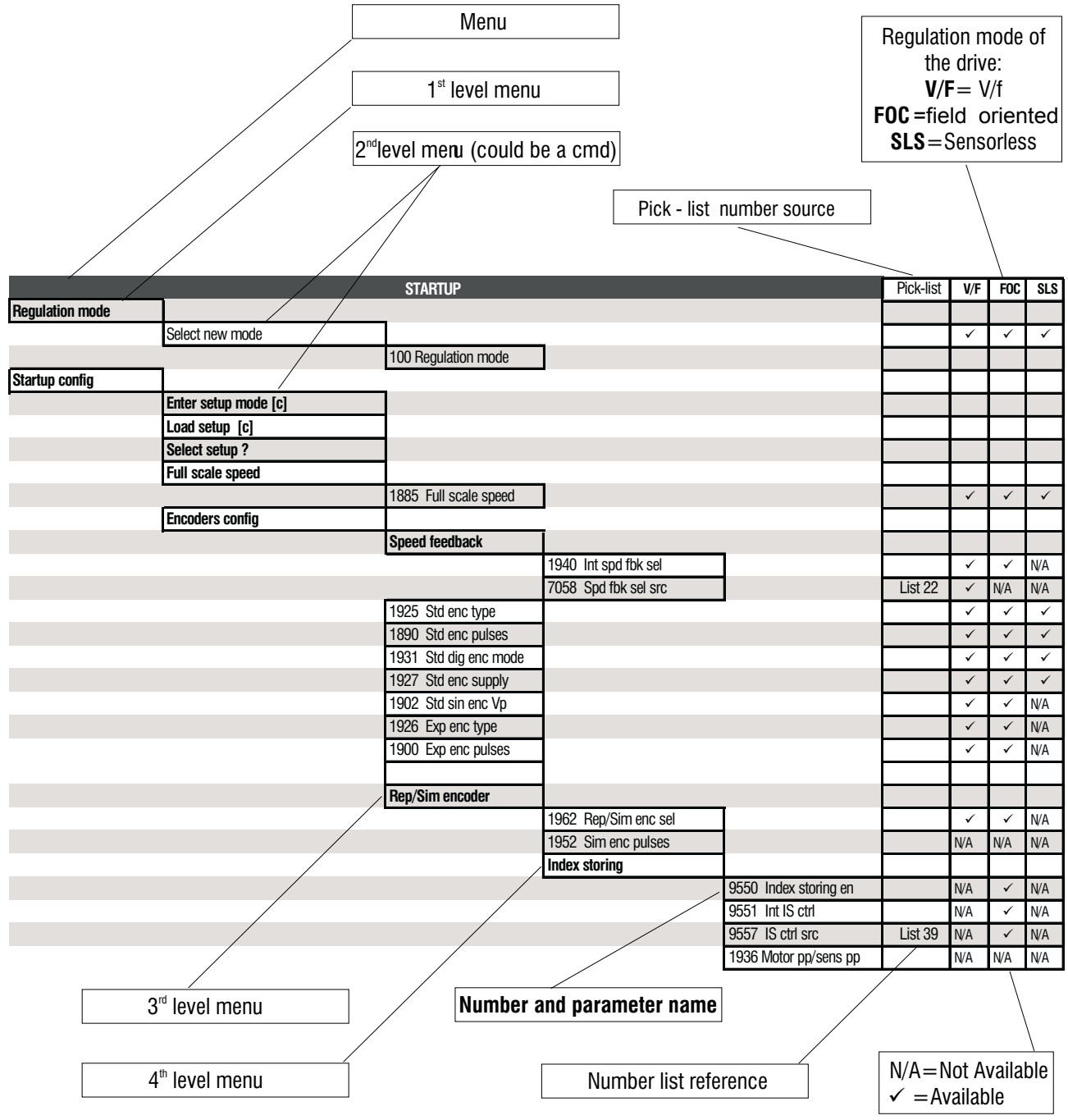
Serial Number _____

Model Number _____

Chapter 3 - PARAMETERS & PICK LISTS

3.1 MENU WITH PARAMETER NUMBERS

3.1.1 Menu Legend



STARTUP					Pick-list	V/F	FOC	SLS
Regulation mode								
	Select new mode					✓	✓	✓
		100 Regulation mode						
Startup config								
	Enter setup mode [c]							
	Load setup [c]							
	Select setup ?							
	Full scale speed							
		1885 Full scale speed				✓	✓	✓
	Encoders config							
		Speed feedback						
			1940 Int spd fbk sel			✓	✓	N/A
			7058 Spd fbk sel src		List 22	✓	N/A	N/A
		1925 Std enc type				✓	✓	✓
		1890 Std enc pulses				✓	✓	✓
		1931 Std dig enc mode				✓	✓	✓
		1927 Std enc supply				✓	✓	✓
		1902 Std sin enc Vp				✓	✓	N/A
		1926 Exp enc type				✓	✓	N/A
		1900 Exp enc pulses				✓	✓	N/A
		Rep/Sim encoder						
			1962 Rep/Sim enc sel			✓	✓	N/A
			1952 Sim enc pulses			N/A	N/A	N/A
			Index storing					
				9550 Index storing en		N/A	✓	N/A
				9551 Int IS ctrl		N/A	✓	N/A
				9557 IS ctrl src	List 39	N/A	✓	N/A
				1936 Motor pp/sens pp		N/A	N/A	N/A

NOTE! Pick lists are showed in section 3.1.3.

3.1.2 Menu

				Pick-list	V/F	FOC	SLS
STATUS							
3060 Output voltage					✓	✓	✓
3070 Output current					✓	✓	✓
3090 Output power					✓	✓	✓
2450 Torque ref					N/A	✓	✓
3080 Output frequency					✓	✓	✓
3221 Norm Speed					✓	✓	✓
3210 Speed ref					✓	✓	✓
3200 Ramp ref					✓	✓	✓
162 Enable SM mon					✓	✓	✓
163 Start SM mon					✓	✓	✓
164 FastStop SM mon							
I/O status					✓	✓	✓
	4028 DI 7654321E				✓	✓	✓
	4064 DO 3210				✓	✓	✓
	4057 DIX BA9876543210				✓	✓	✓
	4078 DOX 76543210				✓	✓	✓
Advanced Status							
	3100 DC link voltage				✓	✓	✓
	3110 Magnetizing curr				✓	✓	✓
	3120 Torque curr				✓	✓	✓
	3130 Magn curr ref				N/A	✓	✓
	3140 Torque curr ref				N/A	✓	✓
	3180 Flux ref				N/A	✓	✓
	3190 Flux				N/A	✓	✓
	1670 Mot OL accum %				✓	✓	✓
	1781 BU OL accum %				✓	✓	✓
	1540 Drv OL accum %				✓	✓	✓
	3222 Norm Std enc spd				✓	✓	✓
	3223 Norm Exp enc spd				✓	✓	N/A
	9553 Std enc position				N/A	✓	N/A
	9554 Exp enc position				N/A	✓	N/A
	9555 Std sin enc mod				N/A	✓	N/A
	9072 HT sensor temp				✓	✓	✓
	9073 RG sensor temp				✓	✓	✓
	9095 IA sensor temp				✓	✓	✓
	9090 Sequencer status				✓	✓	✓
	3230 CPU1 runtime				✓	✓	✓
	3240 CPU2 runtime				✓	✓	✓
Drive ID status							
	1460 Drive cont curr				✓	✓	✓
	114 Drive size				✓	✓	✓
	300 Drive type				✓	✓	✓
	115 Drive name				✓	✓	✓
	810 Actual setup				✓	✓	✓
	Software version V .						
	110 Software type				✓	✓	✓
	111 Software status				✓	✓	✓
	99 Life time				✓	✓	✓
	98 Sys time-ddmmyy				✓	✓	✓
Alarm log					N/A	N/A	N/A
STARTUP				Pick-list	**V/F**	**FOC**	**SLS**
Regulation mode							
	Select new mode				✓	✓	✓
		100 Regulation mode					
Startup config							
	Enter setup mode [c]	-> The drive will reboot to SETUP MODE (see chapter 3.1.2.1)					
	Load setup						
	Select setup ?						
	Full scale speed						
		1885 Full scale speed			✓	✓	✓
	Encoders config						
		Speed feedback					
			1940 Int spd fbk sel		✓	✓	N/A
			7058 Spd fbk sel src	List 22	✓	N/A	N/A
		1925 Std enc type			✓	✓	✓
		1890 Std enc pulses			✓	✓	✓
		1931 Std dig enc mode			✓	✓	✓
		1927 Std enc supply			✓	✓	✓

					Pick-list	V/F	FOC	SLS
		1902 Std sin enc Vp				✓	✓	N/A
		1926 Exp enc type				✓	✓	N/A
		1900 Exp enc pulses				✓	✓	N/A
		Rep/Sim encoder						
			1962 Rep/Sim enc sel			✓	✓	N/A
			1952 Sim enc pulses			N/A	N/A	N/A
			Index storing					
				9550 Index storing en		N/A	✓	N/A
				9551 Int IS ctrl		N/A	✓	N/A
				9557 IS ctrl src	List 39	N/A	✓	N/A
				1936 Motor pp/sens pp		N/A	N/A	N/A
	SpdReg gain calc							
		2048 Calc method				N/A	✓	✓
		2610 Calc Inertia				N/A	✓	✓
		2049 Bandwidth				N/A	✓	✓
	V/f config							
		3420 V/f voltage				✓	N/A	N/A
		3430 V/f frequency				✓	N/A	N/A
		3410 V/f shape				✓	N/A	N/A
	Motor protection							
		1611 Service factor				✓	✓	✓
		1610 Motor OL factor				✓	✓	✓
		1650 Motor OL time				✓	✓	✓
	BU protection							
		1700 BU control				✓	✓	✓
		1740 BU resistance				✓	✓	✓
		1710 BU res cont pwr				✓	✓	✓
		1720 BU res OL time				✓	✓	✓
		1730 BU res OL factor				✓	✓	✓
	Load default ?							
	Abort ?							
Import recipe								
	Select recipe:					✓	✓	✓
Export recipe								
	Select recipe:					✓	✓	✓
Save config ?								
REGULATION PARAM					Pick-list	V/F	FOC	SLS
Spd regulator								
	Percent values							
		3700 SpdP1 gain %				N/A	✓	✓
		3701 SpdI1 gain %				N/A	✓	✓
	Base values							
		2075 SpdP base value				N/A	✓	✓
		2077 SpdI base value				N/A	✓	✓
	In use values							
		2063 InUse SpdP gain%				N/A	✓	✓
		2065 InUse SpdI gain%				N/A	✓	✓
SpdReg autotune								
	9500 Test torque ref					N/A	✓	✓
	Start ?							
	Waiting start...							
	Results							
		9501 Measured Inertia				N/A	✓	✓
		9502 Measured Frict				N/A	✓	✓
Curr regulator								
	Percent values							
		1999 CurrP gain %				✓	✓	✓
		2000 CurrI gain %				✓	✓	✓
	Base values							
		2005 CurrP base value				✓	✓	✓
		2007 CurrI base value				✓	✓	✓
Flux regulator								
	Percent values							
		2013 FlxP gain %				N/A	✓	✓
		2015 FlxI gain %				N/A	✓	✓
	Base values							
		2021 FlxP base value				N/A	✓	✓
Vlt regulator		2023 FlxI base value				N/A	✓	✓
	Percent values							

				Pick-list	V/F	FOC	SLS
		2031 VltP gain %			N/A	✓	✓
		2033 Vltl gain %			N/A	✓	✓
	Base values						
		2039 VltP base value			N/A	✓	✓
		2041 Vltl base value			N/A	✓	✓
Dead time comp							
	530 Dead time limit				✓	✓	✓
	540 Dead time slope				✓	✓	✓
V/f reg param							
	V/f control						
		3400 Voltage boost			✓	N/A	N/A
		3531 Slip comp			✓	N/A	N/A
		3541 Slip comp filter			✓	N/A	N/A
		3585 Antioscill gain			✓	N/A	N/A
		3520 V/f ILim P gain			✓	N/A	N/A
		3530 V/f ILim I gain			✓	N/A	N/A
	V/f save energy						
		Save energy src					
			3538 SE cmd src	List 3	✓	N/A	N/A
			3539 SE flx level src	List 23	✓	N/A	N/A
		Save energy cfg					
			3536 Int SE flx level		✓	N/A	N/A
			3537 SE flx ramp time		✓	N/A	N/A
	V/f catch on fly						
		V/f catch src					
			3582 V/f catch cmd	List 3	✓	N/A	N/A
		V/f catch cfg					
			3545 Spd search time		✓	N/A	N/A
			3550 Vlt search time		✓	N/A	N/A
			3555 Catch init speed		✓	N/A	N/A
			3560 Catch demag dly		✓	N/A	N/A
			3565 Catch retry dly		✓	N/A	N/A
		V/f catch mon					
			3572 Vlt search state		✓	N/A	N/A
Sls SpdFbk gains							
	Motoring gains						
		1090 Sls mot HPgain			N/A	N/A	✓
		1091 Sls mot Hlgain			N/A	N/A	✓
		1092 Sls mot MPgain			N/A	N/A	✓
		1093 Sls mot Mlgain			N/A	N/A	✓
		1094 Sls mot LPgain			N/A	N/A	✓
		1095 Sls mot Llgain			N/A	N/A	✓
	Regen gains						
		1101 Sls regen HPgain			N/A	N/A	✓
		1102 Sls regen Hlgain			N/A	N/A	✓
		1103 Sls regen MPgain			N/A	N/A	✓
		1104 Sls regen Mlgain			N/A	N/A	✓
		1105 Sls regen LPgain			N/A	N/A	✓
		1106 Sls regen Llgain			N/A	N/A	✓
	Gain transitions						
		1096 Sls H/M tran level			N/A	N/A	✓
		1097 Sls M/L tran level			N/A	N/A	✓
		1098 Sls H/M tran bnd			N/A	N/A	✓
		1099 Sls M/L tran bnd			N/A	N/A	✓
		1107 Sls 0 tran bnd			N/A	N/A	✓
		1111 Observer filter			N/A	N/A	✓
	Gain monitor						
		1085 Inuse Sls P gain			N/A	N/A	✓
		1086 Inuse Sls I gain			N/A	N/A	✓
		1112 Observer ref mon			N/A	N/A	✓
Test generator							
	Test gen mode						
		2756 Test gen mode			✓	✓	✓
			Select new mode				
	Test gen cfg						
		2745 Gen Hi ref			✓	✓	✓
		2750 Gen Low ref			✓	✓	✓
		2755 Gen Period			✓	✓	✓

					Pick-list	V/F	FOC	SLS
	Test gen mon							
		2760 Gen output				✓	✓	✓
SAVE PARAMETERS								
I/O CONFIG					Pick-list	V/F	FOC	SLS
Commands								
	Commands src							
		153 Term StrStp src			List 16	✓	✓	✓
		9210 Term Start src			List 16	✓	✓	✓
		9211 Term Stop src			List 16	✓	✓	✓
		156 Dig Enable src			List 17	✓	✓	✓
		157 Dig StrStp src			List 17	✓	✓	✓
		154 FastStop src			List 18	✓	✓	✓
	Commands cfg							
		4002 Commands select				✓	✓	✓
		4004 En/Disable mode				✓	✓	✓
		4006 Spd 0 dis dly				✓	✓	✓
	Commands mon							
		150 Enable cmd mon				✓	✓	✓
		151 Start cmd mon				✓	✓	✓
		152 FastStop cmd mon				✓	✓	✓
Analog inputs								
	Std analog inps							
		Analog input 1						
			An inp 1 src					
				5011 AI 1 sgn src	List 3	✓	✓	✓
				5012 AI 1 alt sel src	List 3	✓	✓	✓
			An inp 1 cfg					
				5000 An inp 1 type		✓	✓	✓
				5002 AI 1 alt value		✓	✓	✓
				5003 An inp 1 thr		✓	✓	✓
				5004 An inp 1 scale		✓	✓	✓
				5006 An inp 1 filter		✓	✓	✓
				5007 An inp 1 low lim		✓	✓	✓
				5008 An inp 1 hi lim		✓	✓	✓
				AI 1 offs tune Start ?		✓	✓	✓
				AI 1 gain tune Start ?		✓	✓	✓
			An inp 1 mon					
				5009 An inp 1 output		✓	✓	✓
				5010 An inp 1 < thr		✓	✓	✓
				5001 An inp 1 offset		✓	✓	✓
				5005 An inp 1 gain		✓	✓	✓
		Analog input 2						
			An inp 2 src					
				5031 AI 2 sgn src	List 3			
				5032 AI 2 alt sel src	List 3			
			An inp 2 cfg					
				5020 An inp 2 type		✓	✓	✓
				5022 AI 2 alt value		✓	✓	✓
				5023 An inp 2 thr		✓	✓	✓
				5024 An inp 2 scale		✓	✓	✓
				5026 An inp 2 filter		✓	✓	✓
				5027 An inp 2 lo lim		✓	✓	✓
				5028 An inp 2 hi lim		✓	✓	✓
				AI 2 offs tune Start ?		✓	✓	✓
				AI 2 gain tune Start ?		✓	✓	✓
			An inp 2 mon					
				5029 An inp 2 output		✓	✓	✓
				5030 An inp 2 < thr		✓	✓	✓
				5021 An inp 2 offset		✓	✓	✓
				5025 An inp 2 gain		✓	✓	✓
		Analog input 3						
			An inp 3 src					
				5051 AI 3 sgn src	List 3	✓	✓	✓
				5052 AI 3 alt sel src	List 3	✓	✓	✓
			An inp 3 cfg					
				5040 An inp 3 type		✓	✓	✓
				5042 AI 3 alt value		✓	✓	✓

					Pick-list	V/F	FOC	SLS
				5043 An inp 3 thr		✓	✓	✓
				5044 An inp 3 scale		✓	✓	✓
				5046 An inp 3 filter		✓	✓	✓
				5047 An inp 3 lo lim		✓	✓	✓
				5048 An inp 3 hi lim		✓	✓	✓
				AI 3 offs tune Start ?		✓	✓	✓
				AI 3 gain tune Start ?		✓	✓	✓
			An inp 3 mon					
				5049 An inp 3 output		✓	✓	✓
				5050 An inp 3 < thr		✓	✓	✓
				5041 An inp 3 offset		✓	✓	✓
				5045 An inp 3 gain		✓	✓	✓
		Exp analog inps						
		Analog input 1X						
			An inp 1X src					
				5069 AI 1X sgn src	List 3	✓	✓	✓
			An inp 1X cfg					
				5060 An inp 1X type		✓	✓	✓
				5062 An inp 1X thr		✓	✓	✓
				5063 An inp 1X scale		✓	✓	✓
				5065 An inp 1X lo lim		✓	✓	✓
				5066 An inp 1X hi lim		✓	✓	✓
				AI 1X offs tune Start ?		✓	✓	✓
				AI 1X gain tune Start ?		✓	✓	✓
			An inp 1X mon					
				5067 An inp 1X output		✓	✓	✓
				5068 An inp 1X < thr		✓	✓	✓
				5061 An inp 1X offset		✓	✓	✓
				5064 An inp 1X gain		✓	✓	✓
		Analog input 2X						
			An inp 2X src					
				5089 AI 2X sgn src	List 3	✓	✓	✓
			An inp 2X cfg					
				5080 An inp 2X type		✓	✓	✓
				5082 An inp 2X thr		✓	✓	✓
				5083 An inp 2X scale		✓	✓	✓
				5085 An inp 2X lo lim		✓	✓	✓
				5086 An inp 2X hi lim		✓	✓	✓
				AI 2X offs tune Start ?		✓	✓	✓
				AI 2X gain tune Start ?		✓	✓	✓
			An inp 2X mon					
				5087 An inp 2X output		✓	✓	✓
				5088 An inp 2X < thr		✓	✓	✓
				5081 An inp 2X offset		✓	✓	✓
				5084 An inp 2X gain		✓	✓	✓
			Exp ana inp en					
				3900 Exp ana inp en		✓	✓	✓
Analog outputs								
		Std analog outs						
		Analog output 1						
			An out 1 src					
				3570 An out 1 src	List 2	✓	✓	✓
			An out 1 cfg					
				6012 An out 1 scale		✓	✓	✓
				6010 An out 1 hi lim		✓	✓	✓
				6011 An out 1 lo lim		✓	✓	✓
			An out 1 mon					
				6013 An out 1 mon		✓	✓	✓
		Analog output 2						
			An out 2 src					
				3580 An out 2 src	List 2	✓	✓	✓
			An out 2 cfg					
				6017 An out 2 scale		✓	✓	✓
				6015 An out 2 hi lim		✓	✓	✓
				6016 An out 2 lo lim		✓	✓	✓
			An out 2 mon					
				6018 An out 2 mon		✓	✓	✓

					Pick-list	V/F	FOC	SLS
Exp analog outs								
	Analog output 1X							
		An out 1X src				✓	✓	✓
			4090	An out 1X src	List 2	✓	✓	✓
		An out 1X cfg						
			6022	An out 1X scale		✓	✓	✓
			6020	An out 1X hi lim		✓	✓	✓
			6021	An out 1X lo lim		✓	✓	✓
		An out 1X mon						
			6023	An out 1X mon		✓	✓	✓
	Analog output 2X							
		An out 2X src						
			4091	An out 2X src	List 2	✓	✓	✓
		An out 2X cfg						
			6027	An out 2X scale		✓	✓	✓
			6025	An out 2X hi lim		✓	✓	✓
			6026	An out 2X lo lim		✓	✓	✓
		An out 2X mon						
			6028	An out 2X mon		✓	✓	✓
	Analog output 3X							
		An out 3X src						
			4092	An out 3X src	List 2	✓	✓	✓
		An out 3X cfg						
			6034	An out 3x type		✓	✓	✓
			6032	An out 3X scale		✓	✓	✓
			6030	An out 3X hi lim		✓	✓	✓
			6031	An out 3X lo lim		✓	✓	✓
		An out 3X mon						
			6033	An out 3X mon		✓	✓	✓
	Analog output 4X							
		An out 4X src						
			4093	An out 4X src	List 2	✓	✓	✓
		An out 4X cfg						
			6039	An out 4x type		✓	✓	✓
			6037	An out 4X scale		✓	✓	✓
			6035	An out 4X hi lim		✓	✓	✓
			6036	An out 4X lo lim		✓	✓	✓
		An out 4X mon						
			6038	An out 4X mon		✓	✓	✓
	Exp ana out en							
		3901 Exp ana out en				✓	✓	✓
Digital inputs								
	Std digital inps							
		Std dig inp cfg						
		4011 DI 1 inversion				✓	✓	✓
		4012 DI 2 inversion				✓	✓	✓
		4013 DI 3 inversion				✓	✓	✓
		4014 DI 4 inversion				✓	✓	✓
		4015 DI 5 inversion				✓	✓	✓
		4016 DI 6 inversion				✓	✓	✓
		4017 DI 7 inversion				✓	✓	✓
		Std dig inp mon						
		4020 DI 0 Enable mon				✓	✓	✓
		4021 DI 1 monitor				✓	✓	✓
		4022 DI 2 monitor				✓	✓	✓
		4023 DI 3 monitor				✓	✓	✓
		4024 DI 4 monitor				✓	✓	✓
		4025 DI 5 monitor				✓	✓	✓
		4026 DI 6 monitor				✓	✓	✓
		4027 DI 7 monitor				✓	✓	✓
		4028 DI 7654321E				✓	✓	✓
	Exp digital inps							
		Exp dig inp cfg						
		4030 DI 0X inversion				✓	✓	✓
		4031 DI 1X inversion				✓	✓	✓
		4032 DI 2X inversion				✓	✓	✓
		4033 DI 3X inversion				✓	✓	✓
		4034 DI 4X inversion				✓	✓	✓
		4035 DI 5X inversion				✓	✓	✓

				Pick-list	V/F	FOC	SLS
			4036 DI 6X inversion		✓	✓	✓
			4037 DI 7X inversion		✓	✓	✓
			4038 DI 8X inversion		✓	✓	✓
			4039 DI 9X inversion		✓	✓	✓
			4040 DI 10X inversion		✓	✓	✓
			4041 DI 11X inversion		✓	✓	✓
		Exp dig inp mon			✓	✓	✓
			4045 DI 0X monitor				
			4046 DI 1X monitor		✓	✓	✓
			4047 DI 2X monitor		✓	✓	✓
			4048 DI 3X monitor		✓	✓	✓
			4049 DI 4X monitor		✓	✓	✓
			4050 DI 5X monitor		✓	✓	✓
			4051 DI 6X monitor		✓	✓	✓
			4052 DI 7X monitor		✓	✓	✓
			4053 DI 8X monitor		✓	✓	✓
			4054 DI 9X monitor		✓	✓	✓
			4055 DI 10X monitor		✓	✓	✓
			4056 DI 11X monitor		✓	✓	✓
			4057 DIX BA9876543210		✓	✓	✓
		Exp dig inp en					
			3902 Exp dig inp en		✓	✓	✓
Digital outputs							
	Std digital outs						
		Std dig out src					
			4065 DO 0 src	List 1	✓	✓	✓
			4066 DO 1 src	List 1	✓	✓	✓
			4067 DO 2 src	List 1	✓	✓	✓
			4068 DO 3 src	List 1	✓	✓	✓
		Std dig out cfg					
			4060 DO 0 inversion		✓	✓	✓
			4061 DO 1 inversion		✓	✓	✓
			4062 DO 2 inversion		✓	✓	✓
			4063 DO 3 inversion		✓	✓	✓
		Std dig out mon					
			4064 DO 3210		✓	✓	✓
	Exp digital outs						
		Exp dig out src					
			4080 DO 0X src	List 1	✓	✓	✓
			4081 DO 1X src	List 1	✓	✓	✓
			4082 DO 2X src	List 1	✓	✓	✓
			4083 DO 3X src	List 1	✓	✓	✓
			4084 DO 4X src	List 1	✓	✓	✓
			4085 DO 5X src	List 1	✓	✓	✓
			4086 DO 6X src	List 1	✓	✓	✓
			4087 DO 7X src	List 1	✓	✓	✓
		Exp dig out cfg					
			4070 DO 0X inversion		✓	✓	✓
			4071 DO 1X inversion		✓	✓	✓
			4072 DO 2X inversion		✓	✓	✓
			4073 DO 3X inversion		✓	✓	✓
			4074 DO 4X inversion		✓	✓	✓
			4075 DO 5X inversion		✓	✓	✓
			4076 DO 6X inversion		✓	✓	✓
			4077 DO 7X inversion		✓	✓	✓
		Exp dig out mon					
			4078 DOX 76543210		✓	✓	✓
		Exp dig out en					
			3903 Exp dig out en		✓	✓	✓
Bits->Word					✓	✓	✓
	Bits->Word0 src						
		2100 Word0 B0 src		List 1	✓	✓	✓
		2101 Word0 B1 src		List 1	✓	✓	✓
		2102 Word0 B2 src		List 1	✓	✓	✓
		2103 Word0 B3 src		List 1	✓	✓	✓
		2104 Word0 B4 src		List 1	✓	✓	✓
		2105 Word0 B5 src		List 1	✓	✓	✓
		2106 Word0 B6 src		List 1	✓	✓	✓
		2107 Word0 B7 src		List 1	✓	✓	✓

			Pick-list	V/F	FOC	SLS
		2108 Word0 B8 src	List 1	✓	✓	✓
		2109 Word0 B9 src	List 1	✓	✓	✓
		2110 Word0 B10 src	List 1	✓	✓	✓
		2111 Word0 B11 src	List 1	✓	✓	✓
		2112 Word0 B12 src	List 1	✓	✓	✓
		2113 Word0 B13 src	List 1	✓	✓	✓
		2114 Word0 B14 src	List 1	✓	✓	✓
		2115 Word0 B15 src	List 1	✓	✓	✓
	Bits->Word0 mon					
		2116 W0 comp out		✓	✓	✓
	Bits->Word1 src					
		9340 Word1 B0 src	List 1	✓	✓	✓
		9341 Word1 B1 src	List 1	✓	✓	✓
		9342 Word1 B2 src	List 1	✓	✓	✓
		9343 Word1 B3 src	List 1	✓	✓	✓
		9344 Word1 B4 src	List 1	✓	✓	✓
		9345 Word1 B5 src	List 1	✓	✓	✓
		9346 Word1 B6 src	List 1	✓	✓	✓
		9347 Word1 B7 src	List 1	✓	✓	✓
		9348 Word1 B8 src	List 1	✓	✓	✓
		9349 Word1 B9 src	List 1	✓	✓	✓
		9350 Word1 B10 src	List 1	✓	✓	✓
		9351 Word1 B11 src	List 1	✓	✓	✓
		9352 Word1 B12 src	List 1	✓	✓	✓
		9353 Word1 B13 src	List 1	✓	✓	✓
		9354 Word1 B14 src	List 1	✓	✓	✓
		9355 Word1 B15 src	List 1	✓	✓	✓
	Bits->Word1 mon					
		9356 W1 comp out		✓	✓	✓
Word->Bits						
	Word0->Bits src					
		2120 W0 decomp src	List 26	✓	✓	✓
	Word0->Bits cfg					
		2121 W0 decomp inp		✓	✓	✓
	Word0->Bits mon					
		2122 W0 decomp mon		✓	✓	✓
		2123 B0 W0 decomp		✓	✓	✓
		2124 B1 W0 decomp		✓	✓	✓
		2125 B2 W0 decomp		✓	✓	✓
		2126 B3 W0 decomp		✓	✓	✓
		2127 B4 W0 decomp		✓	✓	✓
		2128 B5 W0 decomp		✓	✓	✓
		2129 B6 W0 decomp		✓	✓	✓
		2130 B7 W0 decomp		✓	✓	✓
		2131 B8 W0 decomp		✓	✓	✓
		2132 B9 W0 decomp		✓	✓	✓
		2133 B10 W0 decomp		✓	✓	✓
		2134 B11 W0 decomp		✓	✓	✓
		2135 B12 W0 decomp		✓	✓	✓
		2136 B13 W0 decomp		✓	✓	✓
		2137 B14 W0 decomp		✓	✓	✓
		2138 B15 W0 decomp		✓	✓	✓
	Word1->Bits src					
		9361 W1 decomp src	List 27	✓	✓	✓
	Word1->Bits cfg					
		9360 W1 decomp inp		✓	✓	✓
	Word1->Bits mon					
		9362 W1 decomp mon		✓	✓	✓
		9363 B0 W1 decomp		✓	✓	✓
		9364 B1 W1 decomp		✓	✓	✓
		9365 B2 W1 decomp		✓	✓	✓
		9366 B3 W1 decomp		✓	✓	✓
		9367 B4 W1 decomp		✓	✓	✓
		9368 B5 W1 decomp		✓	✓	✓
		9369 B6 W1 decomp		✓	✓	✓
		9370 B7 W1 decomp		✓	✓	✓
		9371 B8 W1 decomp		✓	✓	✓
		9372 B9 W1 decomp		✓	✓	✓
		9373 B10 W1 decomp		✓	✓	✓

					Pick-list	V/F	FOC	SLS
		9374 B11 W1 decomp				✓	✓	✓
		9375 B12 W1 decomp				✓	✓	✓
		9376 B13 W1 decomp				✓	✓	✓
		9377 B14 W1 decomp				✓	✓	✓
		9378 B15 W1 decomp				✓	✓	✓
Fwd Rev Ctrl								
	Fwd Rev Ctrl src							
		8083 Forward src			List 3	✓	✓	✓
		8084 Reverse src			List 3	✓	✓	✓
	Fwd Rev Ctrl mon							
		8080 FRC cmd mon				✓	✓	✓
		8081 FRC invers				✓	✓	✓
		8082 FRC alarm				✓	✓	✓
SAVE PARAMETERS								
RAMP CONFIG					Pick-list	V/F	FOC	SLS
Ramp setpoint								
	Ramp ref src							
		7035 Ramp ref 1 src			List 7	✓	✓	✓
		7036 Ramp ref 2 src			List 8	✓	✓	✓
		7029 Ramp ref 3 src			List 45	✓	✓	✓
		7037 Ramp ref inv src			List 3	✓	✓	✓
	Ramp ref cfg							
		7030 Int ramp ref 1				✓	✓	✓
		7031 Int ramp ref 2				✓	✓	✓
		7038 Int ramp ref 3				✓	✓	✓
	Ramp ref mon							
		7032 Ramp ref 1 mon				✓	✓	✓
		7033 Ramp ref 2 mon				✓	✓	✓
		7039 Ramp ref 3 mon				✓	✓	✓
		7034 Ramp setpoint				✓	✓	✓
Multi ramp	**Multi ramp src**							
		8090 Mlt ramp s0 src			List 3	✓	✓	✓
		8091 Mlt ramp s1 src			List 3	✓	✓	✓
	Multi ramp cfg					✓	✓	✓
		Multi ramp set 0						
			RAMP Acc set 0					
				8040 MR0 acc dlt spd		✓	✓	✓
				8041 MR0 acc dlt time		✓	✓	✓
			RAMP Dec set 0					
				8042 MR0 dec dlt spd		✓	✓	✓
				8043 MR0 dec dlt time		✓	✓	✓
			RAMP Dec FS set 0					
				8044 MR0 fdec dlt spd		✓	✓	✓
				8045 MR0 fdec dlttime		✓	✓	✓
			RAMPScurve time set0					
				8046 MR0 acc S curve		✓	✓	✓
				8047 MR0 dec S curve		✓	✓	✓
		Multi ramp set 1						
			RAMP Acc set 1					
				8050 MR1 acc dlt spd		✓	✓	✓
				8051 MR1 acc dlt time		✓	✓	✓
			RAMP Dec set 1					
				8052 MR1 dec dlt spd		✓	✓	✓
				8053 MR1 dec dlt time		✓	✓	✓
			RAMP Dec FS set 1					
				8054 MR1 fdec dlt spd		✓	✓	✓
				8055 MR1 fdec dlttime		✓	✓	✓
			RAMPScurve time set1					
				8056 MR1 acc S curve		✓	✓	✓
				8057 MR1 dec S curve		✓	✓	✓
		Multi ramp set 2						
			RAMP Acc set 2					
				8060 MR2 acc dlt spd		✓	✓	✓
				8061 MR2 acc dlt time		✓	✓	✓
			RAMP Dec set 2					
				8062 MR2 dec dlt spd		✓	✓	✓
				8063 MR2 dec dlt time		✓	✓	✓
			RAMP Dec FS set 2					
				8064 MR2 fdec dlt spd		✓	✓	✓

					Pick-list	V/F	FOC	SLS
				8065 MR2 fdec dlttime		✓	✓	✓
			RAMPScurve time set2					
				8066 MR2 acc S curve		✓	✓	✓
				8067 MR2 dec S curve		✓	✓	✓
		Multi ramp set 3				✓	✓	✓
			RAMP Acc set 3					
				8070 MR3 acc dlt spd		✓	✓	✓
				8071 MR3 acc dlt time		✓	✓	✓
			RAMP Dec set 3					
				8072 MR3 dec dlt spd		✓	✓	✓
				8073 MR3 dec dlt time		✓	✓	✓
			RAMP Dec FS set 3					
				8074 MR3 fdec dlt spd		✓	✓	✓
				8075 MR3 fdec dlttime		✓	✓	✓
			RAMPScurve time set3					
				8076 MR3 acc S curve		✓	✓	✓
				8077 MR3 dec S curve		✓	✓	✓
	Multi ramp mon							
		8078 Mlt ramp sel mon				✓	✓	✓
Ramp function								
	Ramp funct src							
		8027 Ramp input=0			List 3	✓	✓	✓
		8028 Ramp output=0			List 3	✓	✓	✓
		8029 Ramp freeze			List 3	✓	✓	✓
	Ramp funct cfg							
		8031 Ramp out enable				✓	✓	✓
		8021 Ramp shape				✓	✓	✓
	Ramp funct mon							
		8022 Ramp out mon				✓	✓	✓
		8023 Ramp acc state				✓	✓	✓
		8024 Ramp dec state				✓	✓	✓
		8025 Ramp out != 0				✓	✓	✓
		8026 Ramp cmds mon				✓	✓	✓
SAVE PARAMETERS								
	SPEED CONFIG				Pick-list	V/F	FOC	SLS
Speed setpoint								
	Speed ref src							
		7050 Speed ref 1 src			List 9	✓	✓	✓
		7051 Speed ref 2 src			List 10	✓	✓	✓
		7052 Speed ratio src			List 13	✓	✓	✓
		7053 Speedref inv src			List 3	✓	✓	✓
	Speed ref cfg							
		7040 Int speed ref 1				✓	✓	✓
		7041 Int speed ref 2				✓	✓	✓
		7042 Speed top				✓	✓	✓
		7043 Speed bottom				✓	✓	✓
	Speed ref mon							
		8022 Ramp out mon				✓	✓	✓
		7045 Speed ref 1 mon				✓	✓	✓
		7046 Speed ref 2 mon				✓	✓	✓
		8012 Jog output				✓	✓	✓
		7099 Speed draw out				✓	✓	✓
		7049 Speed lim state				✓	✓	✓
		7047 Speed setpoint				✓	✓	✓
Spd reg function								
	Spd reg func src							
		7054 Spd I=0 src			List 3	N/A	✓	✓
		7056 Spd PI=0 src			List 3	N/A	✓	✓
	Spd reg func cfg							
		7059 Spd reg enable				✓	✓	✓
	Spd reg func mon							
		7055 Spd I=0 mon				N/A	✓	✓
		7057 Spd PI=0 mon				N/A	✓	✓
Jog								
	Jog src							
		8014 Jog 0 src			List 12	✓	✓	✓
		8015 Jog cmd src			List 3	✓	✓	✓
		8016 Jog sel 0 src			List 3	✓	✓	✓

			Pick-list	V/F	FOC	SLS
		8017 Jog sel 1 src	List 3	✓	✓	✓
		8018 Jog invers src	List 3	✓	✓	✓
	Jog cfg					
		8000 Jog 0		✓	✓	✓
		8001 Jog 1		✓	✓	✓
		8002 Jog 2		✓	✓	✓
		8003 Jog 3		✓	✓	✓
		8004 Jog acc dlt spd		✓	✓	✓
		8005 Jog acc dlt time		✓	✓	✓
		8006 Jog dec dlt spd		✓	✓	✓
		8007 Jog dec dlt time		✓	✓	✓
	Jog mon					
		8010 Jog 0 mon		✓	✓	✓
		8011 Jog sel mon		✓	✓	✓
		8012 Jog output		✓	✓	✓
		8013 Jog state		✓	✓	✓
Multi speed						
	Multi speed src					
		7071 Mlt spd 0 src	List11	✓	✓	✓
		7072 Mlt spd s 0 src	List 3	✓	✓	✓
		7073 Mlt spd s 1 src	List 3	✓	✓	✓
		7074 Mlt spd s 2 src	List 3	✓	✓	✓
	Multi speed cfg					
		7060 Mlt spd 0		✓	✓	✓
		7061 Mlt spd 1		✓	✓	✓
		7062 Mlt spd 2		✓	✓	✓
		7063 Mlt spd 3		✓	✓	✓
		7064 Mlt spd 4		✓	✓	✓
		7065 Mlt spd 5		✓	✓	✓
		7066 Mlt spd 6		✓	✓	✓
		7067 Mlt spd 7		✓	✓	✓
	Multi speed mon					
		7068 Mlt spd 0 mon		✓	✓	✓
		7069 Mlt spd sel mon		✓	✓	✓
		7070 Mlt spd out mon		✓	✓	✓
Moto pot						
	Moto pot src					
		7091 Mpot up src	List 3	✓	✓	✓
		7092 Mpot down src	List 3	✓	✓	✓
		7093 Mpot invers src	List 3	✓	✓	✓
		7094 Mpot preset src	List 3	✓	✓	✓
	Moto pot cfg					
		7080 Mpot lower lim		✓	✓	✓
		7081 Mpot upper lim		✓	✓	✓
		7082 Mpot acc dlt spd		✓	✓	✓
		7083 Mpot acc dlt tim		✓	✓	✓
		7084 Mpot dec dlt spd		✓	✓	✓
		7085 Mpot dec dlt tim		✓	✓	✓
		7086 Mpot init cfg		✓	✓	✓
		7087 Mpot preset cfg		✓	✓	✓
	Moto pot mon					
		7089 Mpot cmd mon		✓	✓	✓
		7090 Mpot output mon		✓	✓	✓
Speed ratio						
	Speed ratio src			✓	✓	✓
		7052 Speed ratio src	List 13	✓	✓	✓
	Speed ratio cfg			✓	✓	✓
		7044 Int speed ratio		✓	✓	✓
	Speed ratio mon			✓	✓	✓
		7048 Speed ratio mon		✓	✓	✓
Spd 0 logic				✓	✓	✓
	Spd 0 logic src					
		3732 Spd 0 ref src	List 20	✓	✓	✓
	Spd 0 logic cfg					
		3720 Spd 0 enable		✓	✓	✓
		3721 Int spd 0 ref		✓	✓	✓
		3722 Spd 0 P gain %		N/A	✓	✓
		3723 Spd 0 I gain %		N/A	✓	✓
		3724 Spd 0 speed thr		✓	✓	✓

			Pick-list	V/F	FOC	SLS
		3725 Spd 0 spd delay		✓	✓	✓
		3726 Spd 0 ref thr		✓	✓	✓
		3727 Spd 0 ref delay		✓	✓	✓
	Spd 0 logic mon					
		3728 Spd is zero		✓	✓	✓
		3729 Ref is zero		✓	✓	✓
		3730 Spd is zero dly		✓	✓	✓
		3731 Ref is zero dly		✓	✓	✓
		2063 InUse SpdP gain%		N/A	✓	✓
		2065 InUse SpdI gain%		N/A	✓	✓
Spd gain profile						
	SGP src					
		3713 SGP ref src	List 19	N/A	✓	✓
	SGP cfg					
		3700 SpdP1 gain %		N/A	✓	✓
		3701 SpdI1 gain %		N/A	✓	✓
		3702 SpdP2 gain %		N/A	✓	✓
		3703 SpdI2 gain %		N/A	✓	✓
		3704 SpdP3 gain %		N/A	✓	✓
		3705 SpdI3 gain %		N/A	✓	✓
		3706 SGP tran21 h thr		N/A	✓	✓
		3707 SGP tran32 l thr		N/A	✓	✓
		3708 SGP tran21 band		N/A	✓	✓
		3709 SGP tran32 band		N/A	✓	✓
		3710 Int SGP ref		N/A	✓	✓
		3711 SGP base value		N/A	✓	✓
	SGP mon					
		3712 SGP ref mon		N/A	✓	✓
		2063 InUse SpdP gain%		N/A	✓	✓
		2065 InUse SpdI gain%		N/A	✓	✓
Speed droop						
	Speed droop src					
		2470 Droop en src	List 3	N/A	✓	✓
		2475 Droop comp src	List 21	N/A	✓	✓
	Speed droop cfg					
		2480 Droop gain		N/A	✓	✓
		2490 Droop filter		N/A	✓	✓
		2500 Droop limit		N/A	✓	✓
		2510 Droop comp		N/A	✓	✓
	Speed droop mon					
		2515 Droop out		N/A	✓	✓
Spd fbk deriv						
	Sfbk deriv cfg					
		2530 Sfbk der enable		N/A	✓	✓
		2540 Sfbk der gain		N/A	✓	✓
		2550 Sfbk der base		N/A	✓	✓
		2560 Sfbk der filter		N/A	✓	✓
Inertia/Frict cp						
	I/F cp src					
		2580 I/F cp en src	List 03	N/A	✓	✓
		2605 Inertia src	List 25	N/A	✓	✓
	I/F cp cfg					
		2054 Int Inertia		N/A	✓	✓
		2052 Int Friction		N/A	✓	✓
		2590 Inertia cp flt		N/A	✓	✓
	I/F cp mon					
		2625 I/F cp mon		N/A	✓	✓
SAVE PARAMETERS						
		TORQUE CONFIG	Pick-list	V/F	FOC	SLS
Torque setpoint						
	T setpoint src					
		2431 Torque ref 1 src	List 14	N/A	✓	✓
		2441 Torque ref 2 src	List 15	N/A	✓	✓
		2449 Torque ref 3 src	List 44	N/A	✓	✓
		2385 SpdTrq mode src	List 43	N/A	✓	✓
	T setpoint cfg					
		2430 Int torque ref 1		N/A	✓	✓
		2440 Int torque ref 2		N/A	✓	✓
		2447 Int torque ref 3		N/A	✓	✓

				Pick-list	V/F	FOC	SLS
		2380 Prop filter			N/A	✓	✓
		2390 Int SpdTrq mode			✓	✓	✓
	T setpoint mon						
		2432 Torque ref 1 mon			N/A	✓	✓
		2442 Torque ref 2 mon			N/A	✓	✓
		2443 Torque ref 3 mon			N/A	✓	✓
		2450 Torque ref			N/A	✓	✓
		2446 SpdTrq ctrl stat			N/A	✓	✓
		2448 SpdTrq mode mon					
Torque curr lim							
	Trq curr lim cfg						
		1190 Tcurr lim sel			✓	✓	✓
		1210 Tcurr lim +			✓	✓	✓
		1220 Tcurr lim -			✓	✓	✓
	Trq curr lim mon						
		1250 Inuse Tcurr lim+			✓	✓	✓
		1260 Inuse Tcurr lim-			✓	✓	✓
		2445 Tcurr lim state			✓	✓	✓
Zero torque cmd							
	Zero trq cmd src						
		2451 Zero torque src		List 3	N/A	✓	✓
	Zero trq cmd mon						
		2452 Zero torque mon			N/A	✓	✓
VdcCtrl reg							
	2295 VdcCtrl P gain				N/A	✓	✓
	2296 VdcCtrl I gain				N/A	✓	✓
Max regen power							
	1310 Max regen power				N/A	✓	✓
SAVE PARAMETERS							
FLUX CONFIG				Pick-list	V/F	FOC	SLS
Flux max limit							
	Flux max lim src						
		1121 Flux level src		List 24	N/A	✓	✓
	Flux max lim cfg						
		1120 Int flx maxlim			N/A	✓	✓
	Flux max lim mon						
		1150 Inuse flx maxlim			N/A	✓	✓
Magnetiz config							
	1810 Magn ramp time				N/A	✓	✓
	1815 Lock flux pos				✓	✓	✓
Output vlt ref							
	Out vlt ref src						
		1141 Outvlt lim src			N/A	✓	✓
	Out vlt ref cfg						
		1130 Dyn vlt margin			N/A	✓	✓
		1140 Int Outvlt lim			N/A	✓	✓
	Out vlt ref mon						
		1170 Available Outvlt			N/A	✓	✓
		1180 Inuse Outvlt ref			N/A	✓	✓
SAVE PARAMETERS							
STOP OPTION				Pick-list	V/F	FOC	SLS
DC braking							
	DC braking src						
		1836 DCbrake cmd src		List 3	✓	✓	✓
	DC braking cfg						
		1832 DCbrake mode			✓	✓	✓
		1833 DCbrake delay			✓	✓	✓
		1834 DCbrake duration			✓	✓	✓
		1835 DCbrake current			✓	✓	✓
	DC braking mon						
		1837 DCbrake state			✓	✓	✓
Power loss ctrl							
	Pwrloss ctrl cfg						
		2300 PL function sel			✓	✓	✓
		2302 PL acceleration			✓	✓	✓
		2304 PL deceleration			✓	✓	✓
	Pwrloss ctrl mon						
		2283 PL next active			✓	✓	✓
		2282 PL next factor			✓	✓	✓
	Pwrloss ridethru						

				Pick-list	V/F	FOC	SLS
		Pwrloss ride cfg					
			2270 PLR P gain		N/A	✓	✓
			2280 PLR I gain		N/A	✓	✓
		Pwrloss ride mon					
			2284 PLR active		N/A	✓	✓
	Pwrloss stop						
		Pwrloss stop src					
			2312 PLS mains st src	List 3	✓	✓	✓
		Pwrloss stop cfg					
			2360 PLS P gain		✓	✓	✓
			2370 PLS I gain		✓	✓	✓
			2340 PLS Vdc ref		✓	✓	✓
			2330 PLS curr lim		✓	✓	✓
			2320 PLS timeout		✓	✓	✓
		Pwrloss stop mon					
			2275 PLS active		✓	✓	✓
SAVE PARAMETERS							
ALARM CONFIG				Pick-list	V/F	FOC	SLS
Fault reset							
	9076 Fault reset src			List 3	✓	✓	✓
Undervoltage							
	9050 UV restart				✓	✓	✓
	9051 UV restart time				✓	✓	✓
Overvoltage							
	9052 OV restart				✓	✓	✓
	9053 OV restart time				✓	✓	✓
IGBT desaturat							
	9046 DS restart				✓	✓	✓
	9047 DS restart time				✓	✓	✓
Inst overcurrent							
	9063 IOC restart				✓	✓	✓
	9064 IOC restart time				✓	✓	✓
Ground fault							
	9640 GF activity				✓	✓	✓
	9641 GF threshold				✓	✓	✓
External fault							
	9075 EF src				✓	✓	✓
	9060 EF activity				✓	✓	✓
	9061 EF restart				✓	✓	✓
	9062 EF restart time				✓	✓	✓
	9600 EF hold off				✓	✓	✓
Motor OT							
	9065 MOT activity				✓	✓	✓
	9066 MOT restart				✓	✓	✓
	9067 MOT restart time				✓	✓	✓
	9603 MOT hold off				✓	✓	✓
Heatsink S OT							
	9054 HTS activity				✓	✓	✓
	9055 HTS restart				✓	✓	✓
	9056 HTS restart time				✓	✓	✓
	9604 HTS hold off				✓	✓	✓
Regulation S OT							
	9057 RGS activity				✓	✓	✓
	9058 RGS restart				✓	✓	✓
	9059 RGS restart time				✓	✓	✓
	9605 RGS hold off				✓	✓	✓
Intake air S OT							
	9087 IAS activity				✓	✓	✓
	9088 IAS restart				✓	✓	✓
	9089 IAS restart time				✓	✓	✓
	9606 IAS hold off				✓	✓	✓
ISBus fault							
	9068 ISB activity				✓	✓	✓
	9069 ISB restart				✓	✓	✓
	9070 ISB restart time				✓	✓	✓
Comm card fault							
	9074 CCF activity				✓	✓	✓
	4200 CCF restart				✓	✓	✓
	4201 CCF restart time				✓	✓	✓

				Pick-list	V/F	FOC	SLS
Appl card fault							
	9049 ACF activity				✓	✓	✓
Drive overload							
	9040 DOL activity				✓	✓	✓
Motor overload							
	9041 MOL activity				✓	✓	✓
BU overload							
	9071 BUOL activity				✓	✓	✓
Fwd Rev Ctrl							
	9086 FRC activity				✓	✓	✓
	9607 FRC hold off				✓	✓	✓
Overspeed							
	9220 OS activity				✓	✓	✓
	9221 OS threshold				✓	✓	✓
	9608 OS hold off				✓	✓	✓
Spd fbk loss							
	9042 SFL activity				✓	✓	✓
UV repetitive							
	9043 UVR attempts				✓	✓	✓
	9044 UVR delay				✓	✓	✓
Hw fault							
	4202 Hw fault mon				✓	✓	✓
Alarm status							
	Alm status cfg						
		9610 Mask W1 S1			✓	✓	✓
		9611 Mask W2 S1			✓	✓	✓
		9612 Mask W3 S1			✓	✓	✓
		9614 Mask W1 S2			✓	✓	✓
		9615 Mask W2 S2			✓	✓	✓
		9616 Mask W3 S2			✓	✓	✓
	Alm status mon						
		9630 Alm W1 S1			✓	✓	✓
		9631 Alm W2 S1			✓	✓	✓
		9632 Alm W3 S1			✓	✓	✓
		9634 Alm W1 S2			✓	✓	✓
		9635 Alm W2 S2			✓	✓	✓
		9636 Alm W3 S2			✓	✓	✓
SAVE PARAMETERS							
COMMUNICATION				Pick-list	V/F	FOC	SLS
RS485							
	105 SLink4 address				✓	✓	✓
	106 SLink4 res time				✓	✓	✓
SBI							
	SBI config						
		8999 SBI enable			✓	✓	✓
	SBI monitor						
		8998 Last SBI error			✓	✓	✓
	SBI menu						
	Drv->SBI word						
		Drv->SBI W src					
			9010 Drv SBI W0 src	List 40	✓	✓	✓
			9011 Drv SBI W1 src	List 40	✓	✓	✓
			9012 Drv SBI W2 src	List 40	✓	✓	✓
			9013 Drv SBI W3 src	List 40	✓	✓	✓
			9014 Drv SBI W4 src	List 40	✓	✓	✓
			9015 Drv SBI W5 src	List 40	✓	✓	✓
		Drv->SBI W cfg					
			9020 Int Drv SBI W0		✓	✓	✓
			9021 Int Drv SBI W1		✓	✓	✓
			9022 Int Drv SBI W2		✓	✓	✓
			9023 Int Drv SBI W3		✓	✓	✓
			9024 Int Drv SBI W4		✓	✓	✓
			9025 Int Drv SBI W5		✓	✓	✓
		Drv->SBI W mon					
			9030 Drv SBI W0 mon		✓	✓	✓
			9031 Drv SBI W1 mon		✓	✓	✓
			9032 Drv SBI W2 mon		✓	✓	✓
			9033 Drv SBI W3 mon		✓	✓	✓
			9034 Drv SBI W4 mon		✓	✓	✓

				Pick-list	V/F	FOC	SLS
			9035 Drv SBI W5 mon		✓	✓	✓
	SBI->Drv word						
		SBI->Drv W mon					
			9000 SBI Drv W0 mon		✓	✓	✓
			9001 SBI Drv W1 mon		✓	✓	✓
			9002 SBI Drv W2 mon		✓	✓	✓
			9003 SBI Drv W3 mon		✓	✓	✓
			9004 SBI Drv W4 mon		✓	✓	✓
			9005 SBI Drv W5 mon		✓	✓	✓
ISBus							
	ISBus config						
		4225 ISBus enable			✓	✓	✓
		4226 ISBus Node ID			✓	✓	✓
		4241 Heartbeat time			✓	✓	✓
	ISBus monitor						
		4227 ISB Card status			✓	✓	✓
		4228 Last ISB error			✓	✓	✓
		4229 ISB FAULT memo			✓	✓	✓
		4240 ISB FAULT cnt			✓	✓	✓
	Drv->ISBus word						
		Drv->ISBus W src					
			4230 Drv ISBus W0src	List 28	✓	✓	✓
			4231 Drv ISBus W1src	List 28	✓	✓	✓
			4232 Drv ISBus W2src	List 28	✓	✓	✓
			4233 Drv ISBus W3src	List 28	✓	✓	✓
			4234 Drv ISBus W4src	List 28	✓	✓	✓
			4235 Drv ISBus W5src	List 28	✓	✓	✓
			4236 Drv ISBus W6src	List 28	✓	✓	✓
			4237 Drv ISBus W7src	List 28	✓	✓	✓
		Drv->ISBus W cfg					
			9320 Int Drv ISBus W0		✓	✓	✓
			9321 Int Drv ISBus W1		✓	✓	✓
			9322 Int Drv ISBus W2		✓	✓	✓
			9323 Int Drv ISBus W3		✓	✓	✓
			9324 Int Drv ISBus W4		✓	✓	✓
			9325 Int Drv ISBus W5		✓	✓	✓
			9326 Int Drv ISBus W6		✓	✓	✓
			9327 Int Drv ISBus W7		✓	✓	✓
		Drv->ISBus W mon					
			4216 Drv ISBus W0mon		✓	✓	✓
			4217 Drv ISBus W1mon		✓	✓	✓
			4218 Drv ISBus W2mon		✓	✓	✓
			4219 Drv ISBus W3mon		✓	✓	✓
			4220 Drv ISBus W4mon		✓	✓	✓
			4221 Drv ISBus W5mon		✓	✓	✓
			4222 Drv ISBus W6mon		✓	✓	✓
			4223 Drv ISBus W7mon		✓	✓	✓
	ISBus->Drv word						
		ISBus->Drv W mon					
			9300 ISBus Drv W0 mon		✓	✓	✓
			9301 ISBus Drv W1 mon		✓	✓	✓
			9302 ISBus Drv W2 mon		✓	✓	✓
			9303 ISBus Drv W3 mon		✓	✓	✓
			9304 ISBus Drv W4 mon		✓	✓	✓
			9305 ISBus Drv W5 mon		✓	✓	✓
			9306 ISBus Drv W6 mon		✓	✓	✓
			9307 ISBus Drv W7 mon		✓	✓	✓
SAVE PARAMETERS							
APPL CARD CONFIG				Pick-list	V/F	FOC	SLS
DGFC							
	DGFC config						
		4129 DGFC enable			✓	✓	✓
	DGFC menu						
	DGFC sync Ch						
		Drv->DGFCS W src					
			4100 Drv DGFC-S W0src	List 29	✓	✓	✓
			4101 Drv DGFC-S W1src	List 29	✓	✓	✓

			Pick-list	V/F	FOC	SLS
		4102 Drv DGFC-S W2src	List 29	✓	✓	✓
		4103 Drv DGFC-S W3src	List 29	✓	✓	✓
		4104 Drv DGFC-S W4src	List 29	✓	✓	✓
	Drv->DGFCS W cfg					
		4105 Int DrvDGFC-S W0		✓	✓	✓
		4106 Int DrvDGFC-S W1		✓	✓	✓
		4107 Int DrvDGFC-S W2		✓	✓	✓
		4108 Int DrvDGFC-S W3		✓	✓	✓
		4109 Int DrvDGFC-S W4		✓	✓	✓
	Drv->DGFCS W mon					
		4110 Drv DGFC-S W0mon		✓	✓	✓
		4111 Drv DGFC-S W1mon		✓	✓	✓
		4112 Drv DGFC-S W2mon		✓	✓	✓
		4113 Drv DGFC-S W3mon		✓	✓	✓
		4114 Drv DGFC-S W4mon		✓	✓	✓
	DGFCS->Drv W mon					
		4120 DGFC-S Drv W0mon		✓	✓	✓
		4121 DGFC-S Drv W1mon		✓	✓	✓
		4122 DGFC-S Drv W2mon		✓	✓	✓
		4123 DGFC-S Drv W3mon		✓	✓	✓
		4124 DGFC-S Drv W4mon		✓	✓	✓
DGFC async Ch						
	Drv->DGFCA W src					
		4130 Drv DGFC-A W0src	List 30	✓	✓	✓
		4131 Drv DGFC-A W1src	List 30	✓	✓	✓
		4132 Drv DGFC-A W2src	List 30	✓	✓	✓
		4133 Drv DGFC-A W3src	List 30	✓	✓	✓
		4134 Drv DGFC-A W4src	List 30	✓	✓	✓
		4135 Drv DGFC-A W5src	List 30	✓	✓	✓
		4136 Drv DGFC-A W6src	List 30	✓	✓	✓
		4137 Drv DGFC-A W7src	List 30	✓	✓	✓
		4138 Drv DGFC-A W8src	List 30	✓	✓	✓
		4139 Drv DGFC-A W9src	List 30	✓	✓	✓
	Drv->DGFCA W cfg					
		4140 Int DrvDGFC-A W0		✓	✓	✓
		4141 Int DrvDGFC-A W1		✓	✓	✓
		4142 Int DrvDGFC-A W2		✓	✓	✓
		4143 Int DrvDGFC-A W3		✓	✓	✓
		4144 Int DrvDGFC-A W4		✓	✓	✓
		4145 Int DrvDGFC-A W5		✓	✓	✓
		4146 Int DrvDGFC-A W6		✓	✓	✓
		4147 Int DrvDGFC-A W7		✓	✓	✓
		4148 Int DrvDGFC-A W8		✓	✓	✓
		4149 Int DrvDGFC-A W9		✓	✓	✓
	Drv->DGFCA W mon					
		4150 Drv DGFC-A W0mon		✓	✓	✓
		4151 Drv DGFC-A W1mon		✓	✓	✓
		4152 Drv DGFC-A W2mon		✓	✓	✓
		4153 Drv DGFC-A W3mon		✓	✓	✓
		4154 Drv DGFC-A W4mon		✓	✓	✓
		4155 Drv DGFC-A W5mon		✓	✓	✓
		4156 Drv DGFC-A W6mon		✓	✓	✓
		4157 Drv DGFC-A W7mon		✓	✓	✓
		4158 Drv DGFC-A W8mon		✓	✓	✓
		4159 Drv DGFC-A W9mon		✓	✓	✓
	DGFCA->Drv W mon					
		4160 DGFC-A Drv W0mon		✓	✓	✓
		4161 DGFC-A Drv W1mon		✓	✓	✓
		4162 DGFC-A Drv W2mon		✓	✓	✓
		4163 DGFC-A Drv W3mon		✓	✓	✓
		4164 DGFC-A Drv W4mon		✓	✓	✓
		4165 DGFC-A Drv W5mon		✓	✓	✓
		4166 DGFC-A Drv W6mon		✓	✓	✓
		4167 DGFC-A Drv W7mon		✓	✓	✓
		4168 DGFC-A Drv W8mon		✓	✓	✓
		4169 DGFC-A Drv W9mon		✓	✓	✓
SAVE PARAMETERS						

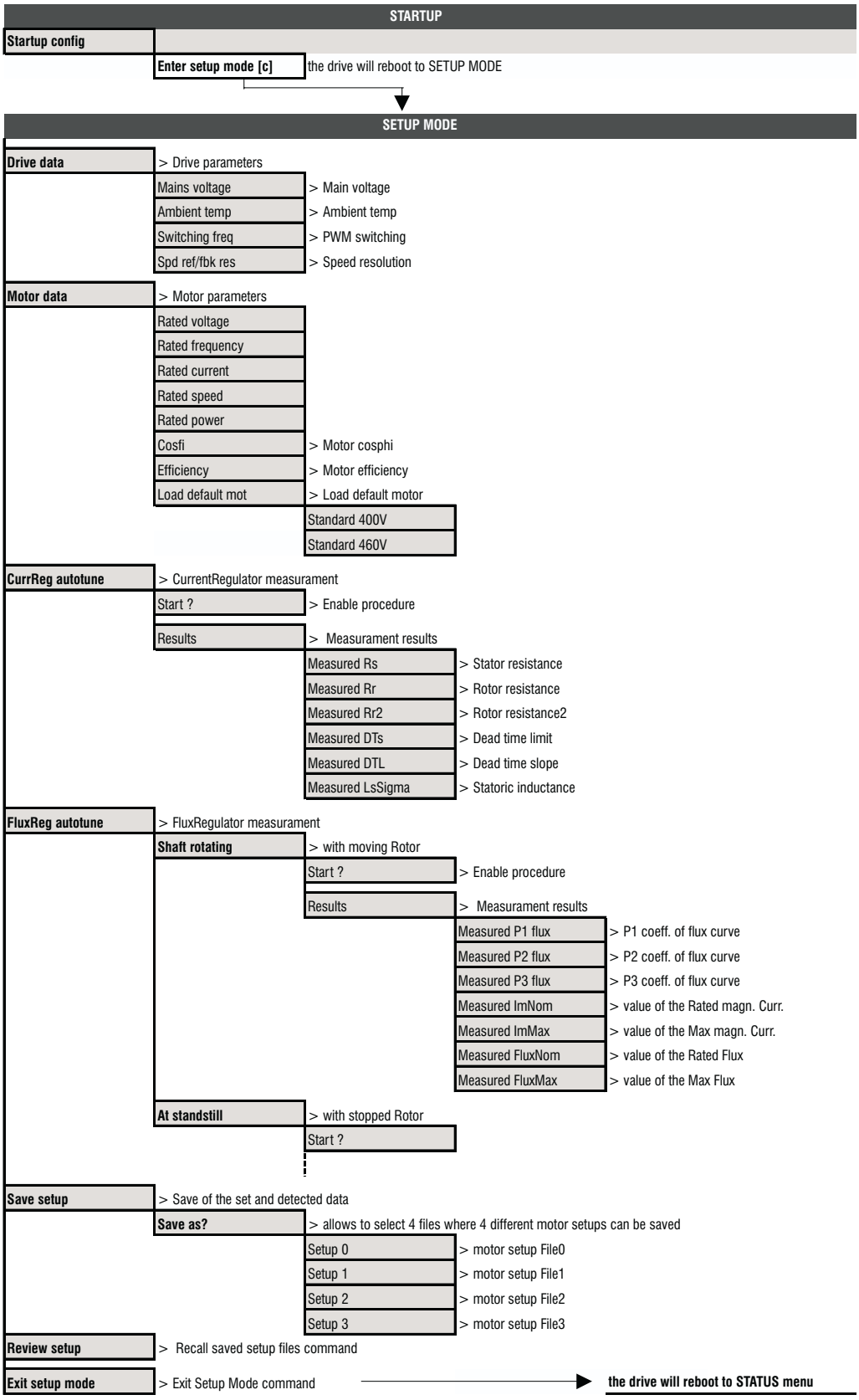
APPL FUNCTION				Pick-list	V/F	FOC	SLS
PID							
	PID function						
		7201 PID enable			✓	✓	✓
	PID feed-forward						
		PID FF src					
			7210 PID inp FF src	List 31	✓	✓	✓
		PID FF cfg					
			7211 Int PID inp FF		✓	✓	✓
			7212 PID inp FF gain		✓	✓	✓
		PID FF mon					
			7216 PID inp FF mon		✓	✓	✓
			7217 PID FF mon		✓	✓	✓
	PID input						
		PID input src					
			7220 PID fbk src	List 32	✓	✓	✓
			7221 PID draw src	List 33	✓	✓	✓
			7222 PID set 0 src	List 34	✓	✓	✓
			7223 PID set 1 src	List 35	✓	✓	✓
			7226 PID seloff 0 src	List 3	✓	✓	✓
		PID input cfg					
			7230 Int PID fbk		✓	✓	✓
			7231 Int PID draw		✓	✓	✓
			7232 Int PID set 0		✓	✓	✓
			7233 Int PID set 1		✓	✓	✓
			7236 PID gain draw		✓	✓	✓
			7237 PID acc time		✓	✓	✓
			7238 PID dec time		✓	✓	✓
			7239 PID clamp bot		✓	✓	✓
			7240 PID clamp top		✓	✓	✓
		PID input mon					
			7250 PID fbk mon		✓	✓	✓
			7251 PID draw mon		✓	✓	✓
			7252 PID set 0 mon		✓	✓	✓
			7253 PID set 1 mon		✓	✓	✓
			7256 PID input		✓	✓	✓
	PI control						
		PI control src					
			7260 PID PI enab src	List 3	✓	✓	✓
			7261 PID I freeze src	List 3	✓	✓	✓
			7280 PIGP ref src	List 36	✓	✓	✓
			7320 PID Mlt PI sel 0	List 3	✓	✓	✓
			7321 PID Mlt PI sel 1	List 3	✓	✓	✓
			7322 PID Mlt PI 3 src	List 38	✓	✓	✓
		PI control cfg					
			7263 PI steady delay		✓	✓	✓
			7264 PI steady thr		✓	✓	✓
			7270 PI P1 gain %		✓	✓	✓
			7271 PI I1 gain %		✓	✓	✓
			7272 PI P2 gain %		✓	✓	✓
			7273 PI I2 gain %		✓	✓	✓
			7274 PI P3 gain %		✓	✓	✓
			7275 PI I3 gain %		✓	✓	✓
			7276 PIGP tran21 hthr		✓	✓	✓
			7277 PIGP tran32 lthr		✓	✓	✓
			7278 PIGP tran21 band		✓	✓	✓
			7279 PIGP tran32 band		✓	✓	✓
			7290 PI Pinit gain		✓	✓	✓
			7291 PI Iinit gain		✓	✓	✓
			7292 PI clamp top		✓	✓	✓
			7293 PI clamp bot		✓	✓	✓
			7324 Int PID Mlt PI 1		✓	✓	✓
			7325 Int PID Mlt PI 2		✓	✓	✓
			7326 Int PID Mlt PI 3		✓	✓	✓
		PI control mon					
			7265 PID PI lock mon		✓	✓	✓
			7282 PIGP ref mon		✓	✓	✓
			7283 PI Pnorm gain		✓	✓	✓
			7284 PI Inorm gain		✓	✓	✓
			7294 PID PI out mon		✓	✓	✓

					Pick-list	V/F	FOC	SLS
			7327 PID Mlt PI 0 mon			✓	✓	✓
			7328 PID Mlt PI 3 mon			✓	✓	✓
			7329 PID MltPI selmon			✓	✓	✓
	PD control							
		PD control src						
			7340 PID PD enab src		List 3	✓	✓	✓
			7310 PDGP ref src		List 37	✓	✓	✓
		PD control cfg						
			7300 PD P1 gain %			✓	✓	✓
			7301 PD D1 gain %			✓	✓	✓
			7302 PD P2 gain %			✓	✓	✓
			7303 PD D2 gain %			✓	✓	✓
			7304 PD P3 gain %			✓	✓	✓
			7305 PD D3 gain %			✓	✓	✓
			7306 PDGP tran21 hthr			✓	✓	✓
			7307 PDGP tran32 lthr			✓	✓	✓
			7308 PDGP tran21 band			✓	✓	✓
			7309 PDGP tran32 band			✓	✓	✓
			7311 Int PDGP ref			✓	✓	✓
			7342 PD der filter			✓	✓	✓
		PD control mon						
			7343 PID PD out mon			✓	✓	✓
			7312 PD P gain mon			✓	✓	✓
			7313 PD D gain mon			✓	✓	✓
			7314 PDGP ref mon			✓	✓	✓
	PID output							
		PID output cfg						
			7350 PID out sign			✓	✓	✓
			7351 PID out gain			✓	✓	✓
		PID output mon						
			7352 PID out mon			✓	✓	✓
			7353 PID outS mon			✓	✓	✓
	Diameter calc							
		Diameter calc	Diameter calc Settings					
				7360 Max deviation		✓	✓	✓
				7361 Positioning spd		✓	✓	✓
				7362 Gear box ratio		✓	✓	✓
				7363 Dancer constant		✓	✓	✓
				7364 Minimum diameter		✓	✓	✓
				7402 DiaClc start src	List 3	✓	✓	✓
			Diameter calc Start ?			✓	✓	✓
			Diameter calc Press I key			✓	✓	✓
			Diameter calc Results			✓	✓	✓
				7365 Diameter		✓	✓	✓
				7366 Diacal PI out		✓	✓	✓
				7370 DCDelta error		✓	✓	✓
				7371 DCDelta pos		✓	✓	✓
SAVE PARAMETERS								
CUSTOM FUNCTIONS					Pick-list	V/F	FOC	SLS
Compare								
	Compare 1							
		Compare 1 src						
			6049 Cmp 1 inp 0 src		List 5	✓	✓	✓
			6050 Cmp 1 inp 1 src		List 5	✓	✓	✓
			6051 Cmp 1 inp 2 src		List 5	✓	✓	✓
		Compare 1 cfg						
			6041 Cmp 1 inp 0			✓	✓	✓
			6042 Cmp 1 inp 1			✓	✓	✓
			6043 Cmp 1 inp 2			✓	✓	✓
			6044 Cmp 1 function			✓	✓	✓
			6045 Cmp 1 window			✓	✓	✓
			6046 Cmp 1 delay			✓	✓	✓
			6047 Cmp 1 inversion			✓	✓	✓
		Compare 1 mon				✓	✓	✓
			6048 Compare 1 output			✓	✓	✓
	Compare 2							
		Compare 2 src						
			6064 Cmp 2 inp 0 src		List 6	✓	✓	✓
			6065 Cmp 2 inp 1 src		List 6	✓	✓	✓

				Pick-list	V/F	FOC	SLS
			6066 Cmp 2 inp 2 src	List 6	✓	✓	✓
		Compare 2 cfg					
			6056 Cmp 2 inp 0		✓	✓	✓
			6057 Cmp 2 inp 1		✓	✓	✓
			6058 Cmp 2 inp 2		✓	✓	✓
			6059 Cmp 2 function		✓	✓	✓
			6060 Cmp 2 window		✓	✓	✓
			6061 Cmp 2 delay		✓	✓	✓
			6062 Cmp 2 inversion		✓	✓	✓
		Compare 2 mon					
			6063 Compare 2 output		✓	✓	✓
Pad parameters							
	Pad param word						
		9100 Pad 0			✓	✓	✓
		9101 Pad 1			✓	✓	✓
		9102 Pad 2			✓	✓	✓
		9103 Pad 3			✓	✓	✓
		9104 Pad 4			✓	✓	✓
		9105 Pad 5			✓	✓	✓
		9106 Pad 6			✓	✓	✓
		9107 Pad 7			✓	✓	✓
		9108 Pad 8			✓	✓	✓
		9109 Pad 9			✓	✓	✓
		9110 Pad 10			✓	✓	✓
		9111 Pad 11			✓	✓	✓
		9112 Pad 12			✓	✓	✓
		9113 Pad 13			✓	✓	✓
		9114 Pad 14			✓	✓	✓
		9115 Pad 15			✓	✓	✓
	Pad param bit						
		9116 Dig pad 0			✓	✓	✓
		9117 Dig pad 1			✓	✓	✓
		9118 Dig pad 2			✓	✓	✓
		9119 Dig pad 3			✓	✓	✓
		9120 Dig pad 4			✓	✓	✓
		9121 Dig pad 5			✓	✓	✓
		9122 Dig pad 6			✓	✓	✓
		9123 Dig pad 7			✓	✓	✓
		9124 Dig pad 8			✓	✓	✓
		9125 Dig pad 9			✓	✓	✓
		9126 Dig pad 10			✓	✓	✓
		9127 Dig pad 11			✓	✓	✓
		9128 Dig pad 12			✓	✓	✓
		9129 Dig pad 13			✓	✓	✓
		9130 Dig pad 14			✓	✓	✓
		9131 Dig pad 15			✓	✓	✓
SAVE PARAMETERS							
SERVICE							
Insert password							
	Insert password						
Check password							

3.1.3.1 Setup Mode Menu

Following menu will be activated by: STARTUP / Startup config / Enter setup mode



3.1.3 Pick lists

Pick List 1	V/F	FOC	SLS
NULL 4000	v	v	v
ONE 4001	v	v	v
Vlt search state 3572	v	N/A	N/A
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Enable cmd mon 150	v	v	v
Start cmd mon 151	v	v	v
FastStop cmd mon 152	v	v	v
An inp 1 < thr 5010	v	v	v
An inp 2 < thr 5030	v	v	v
An inp 3 < thr 5050	v	v	v
An inp 1X < thr 5068	v	v	v
An inp 2X < thr 5088	v	v	v
DI 0 Enable mon 4020	v	v	v
DI 1 monitor 4021	v	v	v
DI 2 monitor 4022	v	v	v
DI 3 monitor 4023	v	v	v
DI 4 monitor 4024	v	v	v
DI 5 monitor 4025	v	v	v
DI 6 monitor 4026	v	v	v
DI 7 monitor 4027	v	v	v
DI 0X monitor 4045	v	v	v
DI 1X monitor 4046	v	v	v
DI 2X monitor 4047	v	v	v
DI 3X monitor 4048	v	v	v
DI 4X monitor 4049	v	v	v
DI 5X monitor 4050	v	v	v
DI 6X monitor 4051	v	v	v
DI 7X monitor 4052	v	v	v
DI 8X monitor 4053	v	v	v
DI 9X monitor 4054	v	v	v
DI 10X monitor 4055	v	v	v
DI 11X monitor 4056	v	v	v
B2 W0 decomp 2125	v	v	v
B3 W0 decomp 2126	v	v	v
B4 W0 decomp 2127	v	v	v
B5 W0 decomp 2128	v	v	v
B6 W0 decomp 2129	v	v	v
B7 W0 decomp 2130	v	v	v
B8 W0 decomp 2131	v	v	v
B9 W0 decomp 2132	v	v	v
B10 W0 decomp 2133	v	v	v
B11 W0 decomp 2134	v	v	v
B12 W0 decomp 2135	v	v	v
B13 W0 decomp 2136	v	v	v
B14 W0 decomp 2137	v	v	v
B15 W0 decomp 2138	v	v	v
B0 W1 decomp 9363	v	v	v
B1 W1 decomp 9364	v	v	v
B2 W1 decomp 9365	v	v	v
B3 W1 decomp 9366	v	v	v
B4 W1 decomp 9367	v	v	v
B5 W1 decomp 9368	v	v	v
B6 W1 decomp 9369	v	v	v
B7 W1 decomp 9370	v	v	v
B8 W1 decomp 9371	v	v	v
B9 W1 decomp 9372	v	v	v
B10 W1 decomp 9373	v	v	v
B11 W1 decomp 9374	v	v	v
B12 W1 decomp 9375	v	v	v
B13 W1 decomp 9376	v	v	v
B14 W1 decomp 9377	v	v	v
B15 W1 decomp 9378	v	v	v
FRC inversion 8081	v	v	v
Ramp acc state 8023	v	v	v
Ramp dec state 8024	v	v	v

	V/F	FOC	SLS
Ramp out != 0 8025	v	v	v
Speed lim state 7049	v	v	v
Spd is zero 3728	v	v	v
Ref is zero 3729	v	v	v
Spd is zero dly 3730	v	v	v
Ref is zero dly 3731	v	v	v
Tcurr lim state 2445	v	v	v
SpdTrq ctrl stat 2446	N/A	v	v
DCbrake state 1837	v	v	v
PL next active 2283	v	v	v
PLR active 2284	N/A	v	v
PLS active 2275	v	v	v
PLS timeout act 2276	v	v	v
Drv OL trip 1570	v	v	v
Drv OL warning 1580	v	v	v
Mot OL trip 1680	v	v	v
BU OL trip 1782	v	v	v
Act spd fbk sel 1941	N/A	v	N/A
Std enc fail 3224	N/A	v	N/A
Exp enc fail 3225	N/A	v	N/A
Alm W1 S1 9630	v	v	v
Alm W2 S1 9631	v	v	v
Alm W3 S1 9632	v	v	v
Alm W1 S2 9634	v	v	v
Alm W2 S2 9635	v	v	v
Alm W3 S2 9636	v	v	v
Diacal active 7367	v	v	v
Compare 1 output 6048	v	v	v
Compare 2 output 6063	v	v	v
Dig pad 0 9116	v	v	v
Dig pad 1 9117	v	v	v
Dig pad 2 9118	v	v	v
Dig pad 3 9119	v	v	v
Dig pad 4 9120	v	v	v
Dig pad 5 9121	v	v	v
Dig pad 6 9122	v	v	v
Dig pad 7 9123	v	v	v
Dig pad 8 9124	v	v	v
Dig pad 9 9125	v	v	v
Dig pad 10 9126	v	v	v
Dig pad 11 9127	v	v	v
Dig pad 12 9128	v	v	v
Dig pad 13 9129	v	v	v
Dig pad 14 9130	v	v	v
Dig pad 15 9131	v	v	v

Pick List 2			
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	v
Drv OL accum % 1540	v	v	N/A

	V/F	FOC	SLS
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v

		V/F	FOC	SLS
Pad 6	9106	v	v	v
Pad 7	9107	v	v	v
Pad 8	9108	v	v	v
Pad 9	9109	v	v	v
Pad 10	9110	v	v	v
Pad 11	9111	v	v	v
Pad 12	9112	v	v	v
Pad 13	9113	v	v	v
Pad 14	9114	v	v	v
Pad 15	9115	v	v	v
Std enc position	9553	N/A	v	v
Exp enc position	9554	N/A	v	v
H Index register	9555	N/A	v	v
L Index register	9556	N/A	v	v

Pick List 3

NULL	4000	v	v	v
ONE	4001	v	v	v
DI 0 Enable mon	4020	v	v	v
DI 1 monitor	4021	v	v	v
DI 2 monitor	4022	v	v	v
DI 3 monitor	4023	v	v	v
DI 4 monitor	4024	v	v	v
DI 5 monitor	4025	v	v	v
DI 6 monitor	4026	v	v	v
DI 7 monitor	4027	v	v	v
DI 0X monitor	4045	v	v	v
DI 1X monitor	4046	v	v	v
DI 2X monitor	4047	v	v	v
DI 3X monitor	4048	v	v	v
DI 4X monitor	4049	v	v	v
DI 5X monitor	4050	v	v	v
DI 6X monitor	4051	v	v	v
DI 7X monitor	4052	v	v	v
DI 8X monitor	4053	v	v	v
DI 9X monitor	4054	v	v	v
DI 10X monitor	4055	v	v	v
DI 11X monitor	4056	v	v	v
B0 W0 decomp	2123	v	v	v
B1 W0 decomp	2124	v	v	v
B2 W0 decomp	2125	v	v	v
B3 W0 decomp	2126	v	v	v
B4 W0 decomp	2127	v	v	v
B5 W0 decomp	2128	v	v	v
B6 W0 decomp	2129	v	v	v
B7 W0 decomp	2130	v	v	v
B8 W0 decomp	2131	v	v	v
B9 W0 decomp	2132	v	v	v
B10 W0 decomp	2133	v	v	v
B11 W0 decomp	2134	v	v	v
B12 W0 decomp	2135	v	v	v
B13 W0 decomp	2136	v	v	v
B14 W0 decomp	2137	v	v	v
B15 W0 decomp	2138	v	v	v
B0 W1 decomp	9363	v	v	v
B1 W1 decomp	9364	v	v	v
B2 W1 decomp	9365	v	v	v
B3 W1 decomp	9366	v	v	v
B4 W1 decomp	9367	v	v	v
B5 W1 decomp	9368	v	v	v
B6 W1 decomp	9369	v	v	v
B7 W1 decomp	9370	v	v	v
B8 W1 decomp	9371	v	v	v
B9 W1 decomp	9372	v	v	v
B10 W1 decomp	9373	v	v	v
B11 W1 decomp	9374	v	v	v
B12 W1 decomp	9375	v	v	v
B13 W1 decomp	9376	v	v	v
B14 W1 decomp	9377	v	v	v
B15 W1 decomp	9378	v	v	v
FRC inversion	8081	v	v	v

		V/F	FOC	SLS
SBI Drv W0 mon	9000	v	v	v
SBI Drv W1 mon	9001	v	v	v
SBI Drv W2 mon	9002	v	v	v
SBI Drv W3 mon	9003	v	v	v
SBI Drv W4 mon	9004	v	v	v
SBI Drv W5 mon	9005	v	v	v
ISBus Drv W0 mon	9300	v	v	v
ISBus Drv W1 mon	9301	v	v	v
ISBus Drv W2 mon	9302	v	v	v
ISBus Drv W3 mon	9303	v	v	v
ISBus Drv W4 mon	9304	v	v	v
ISBus Drv W5 mon	9305	v	v	v
ISBus Drv W6 mon	9306	v	v	v
ISBus Drv W7 mon	9307	v	v	v
DGFC-S Drv W0mon	4120	v	v	v
DGFC-S Drv W1mon	4121	v	v	v
DGFC-S Drv W2mon	4122	v	v	v
DGFC-S Drv W3mon	4123	v	v	v
DGFC-S Drv W4mon	4124	v	v	v
DGFC-A Drv W0mon	4160	v	v	v
DGFC-A Drv W1mon	4161	v	v	v
DGFC-A Drv W2mon	4162	v	v	v
DGFC-A Drv W3mon	4163	v	v	v
DGFC-A Drv W4mon	4164	v	v	v
DGFC-A Drv W5mon	4165	v	v	v
DGFC-A Drv W6mon	4166	v	v	v
DGFC-A Drv W7mon	4167	v	v	v
DGFC-A Drv W8mon	4168	v	v	v
DGFC-A Drv W9mon	4169	v	v	v
Dig pad 0	9116	v	v	v
Dig pad 1	9117	v	v	v
Dig pad 2	9118	v	v	v
Dig pad 3	9119	v	v	v
Dig pad 4	9120	v	v	v
Dig pad 5	9121	v	v	v
Dig pad 6	9122	v	v	v
Dig pad 7	9123	v	v	v
Dig pad 8	9124	v	v	v
Dig pad 9	9125	v	v	v
Dig pad 10	9126	v	v	v
Dig pad 11	9127	v	v	v
Dig pad 12	9128	v	v	v
Dig pad 13	9129	v	v	v
Dig pad 14	9130	v	v	v
Dig pad 15	9131	v	v	v

Pick List 4

NULL	4000	v	v	v
ONE	4001	v	v	v
Gen output	2760	v	v	v
An inp 1 output	5009	v	v	v
An inp 2 output	5029	v	v	v
An inp 3 output	5049	v	v	v
An inp 1X output	5067	v	v	v
An inp 2X output	5087	v	v	v
W0 comp out	2116	v	v	v
W1 comp out	9356	v	v	v
SBI Drv W0 mon	9000	v	v	v
SBI Drv W1 mon	9001	v	v	v
SBI Drv W2 mon	9002	v	v	v
SBI Drv W3 mon	9003	v	v	v
SBI Drv W4 mon	9004	v	v	v
SBI Drv W5 mon	9005	v	v	v
ISBus Drv W0 mon	9300	v	v	v
ISBus Drv W1 mon	9301	v	v	v
ISBus Drv W2 mon	9302	v	v	v
ISBus Drv W3 mon	9303	v	v	v
ISBus Drv W4 mon	9304	v	v	v
ISBus Drv W5 mon	9305	v	v	v
ISBus Drv W6 mon	9306	v	v	v
ISBus Drv W7 mon	9307	v	v	v

		V/F	FOC	SLS
DGFC-S Drv W0mon	4120	v	v	v
DGFC-S Drv W1mon	4121	v	v	v
DGFC-S Drv W2mon	4122	v	v	v
DGFC-S Drv W3mon	4123	v	v	v
DGFC-S Drv W4mon	4124	v	v	v
DGFC-A Drv W0mon	4160	v	v	v
DGFC-A Drv W1mon	4161	v	v	v
DGFC-A Drv W2mon	4162	v	v	v
DGFC-A Drv W3mon	4163	v	v	v
DGFC-A Drv W4mon	4164	v	v	v
DGFC-A Drv W5mon	4165	v	v	v
DGFC-A Drv W6mon	4166	v	v	v
DGFC-A Drv W7mon	4167	v	v	v
DGFC-A Drv W8mon	4168	v	v	v
DGFC-A Drv W9mon	4169	v	v	v
PID FF mon	7217	v	v	v
PID input	7256	v	v	v
PID PI out mon	7294	v	v	v
Last PI out	7295	v	v	v
PID PD out mon	7343	v	v	v
PID out mon	7352	v	v	v
PID outS mon	7353	v	v	v
Pad 0	9100	v	v	v
Pad 1	9101	v	v	v
Pad 2	9102	v	v	v
Pad 3	9103	v	v	v
Pad 4	9104	v	v	v
Pad 5	9105	v	v	v
Pad 6	9106	v	v	v
Pad 7	9107	v	v	v
Pad 8	9108	v	v	v
Pad 9	9109	v	v	v
Pad 10	9110	v	v	v
Pad 11	9111	v	v	v
Pad 12	9112	v	v	v
Pad 13	9113	v	v	v
Pad 14	9114	v	v	v
Pad 15	9115	v	v	v

Pick List 5

Cmp 1 inp 0	6041	v	v	v
Cmp 1 inp 1	6042	v	v	v
Cmp 1 inp 2	6043	v	v	v
NULL	4000	v	v	v
ONE	4001	v	v	v
Output voltage	3060	v	v	v
Output current	3070	v	v	v
Output frequency	3080	v	v	v
Output power	3090	v	v	v
DC link voltage	3100	v	v	v
Magnetizing curr	3110	v	v	v
Torque curr	3120	v	v	v
Magn curr ref	3130	N/A	v	v
Torque curr ref	3140	N/A	v	v
Current phase U	3150	v	v	v
Current phase V	3160	v	v	v
Current phase W	3170	v	v	v
Flux ref	3180	N/A	v	v
Flux	3190	N/A	v	v
Ramp ref	3200	v	v	v
Speed ref	3210	v	v	v
Speed	3220	v	v	v
Norm Speed	3221	v	v	v
Fault Pin	9098	v	v	v
Norm Std enc spd	3222	v	v	v
Norm Exp enc spd	3223	v	v	N/A
Drv OL accum %	1540	v	v	v
Mot OL accum %	1670	v	v	v
BU OL accum %	1781	v	v	v
Drive ready	161	v	v	v
Enable SM mon	162	v	v	v

	V/F	FOC	SLS
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v

	V/F	FOC	SLS
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	v
Exp enc position 9554	N/A	v	v
H Index register 9555	N/A	v	v
L Index register 9556	N/A	v	v

Pick List 6

Cmp 2 inp 0 6041	v	v	v
Cmp 2 inp 1 6042	v	v	v
Cmp 2 inp 2 6043	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v

	V/F	FOC	SLS
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	v
Exp enc position 9554	N/A	v	v
H Index register 9555	N/A	v	v
L Index register 9556	N/A	v	v

Pick List 7

Int ramp ref 1 7030	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v

	V/F	FOC	SLS
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v

Pick List 8

Int ramp ref 2 7031	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v

Pick List 9

Int speed ref 1 7040	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v

Pick List 10

Int speed ref 2 7041	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v

	V/F	FOC	SLS
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A

Pick List 11

Mlt spd 0 7060	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v

	V/F	FOC	SLS
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A

Pick List 12

Jog 0 8000	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v

	V/F	FOC	SLS
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v

Pick List 13

Int speed ratio 7044	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v

	V/F	FOC	SLS
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 14

Int torque ref 1 2430	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
I/F cp mon 2625	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v

	V/F	FOC	SLS
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 15

Int torque ref 2 2440	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
I/F cp mon 2625	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v

	V/F	FOC	SLS
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 16

NULL 4000	v	v	v
ONE 4001	v	v	v
DI 0 Enable mon 4020	v	v	v
DI 1 monitor 4021	v	v	v
DI 2 monitor 4022	v	v	v
DI 3 monitor 4023	v	v	v
DI 4 monitor 4024	v	v	v
DI 5 monitor 4025	v	v	v
DI 6 monitor 4026	v	v	v
DI 7 monitor 4027	v	v	v
DI 0X monitor 4045	v	v	v
DI 1X monitor 4046	v	v	v
DI 2X monitor 4047	v	v	v
DI 3X monitor 4048	v	v	v
DI 4X monitor 4049	v	v	v
DI 5X monitor 4050	v	v	v
DI 6X monitor 4051	v	v	v
DI 7X monitor 4052	v	v	v
DI 8X monitor 4053	v	v	v
DI 9X monitor 4054	v	v	v
DI 10X monitor 4055	v	v	v
DI 11X monitor 4056	v	v	v

Pick List 17

NULL 4000	v	v	v
ONE 4001	v	v	v
B0 W0 decomp 2123	v	v	v
B1 W0 decomp 2124	v	v	v
B2 W0 decomp 2125	v	v	v
B3 W0 decomp 2126	v	v	v
B4 W0 decomp 2127	v	v	v
B5 W0 decomp 2128	v	v	v
B6 W0 decomp 2129	v	v	v
B7 W0 decomp 2130	v	v	v
B8 W0 decomp 2131	v	v	v
B9 W0 decomp 2132	v	v	v
B10 W0 decomp 2133	v	v	v
B11 W0 decomp 2134	v	v	v
B12 W0 decomp 2135	v	v	v
B13 W0 decomp 2136	v	v	v
B14 W0 decomp 2137	v	v	v
B15 W0 decomp 2138	v	v	v

	V/F	FOC	SLS
B0 W1 decomp 9363	v	v	v
B1 W1 decomp 9364	v	v	v
B2 W1 decomp 9365	v	v	v
B3 W1 decomp 9366	v	v	v
B4 W1 decomp 9367	v	v	v
B5 W1 decomp 9368	v	v	v
B6 W1 decomp 9369	v	v	v
B7 W1 decomp 9370	v	v	v
B8 W1 decomp 9371	v	v	v
B9 W1 decomp 9372	v	v	v
B10 W1 decomp 9373	v	v	v
B11 W1 decomp 9374	v	v	v
B12 W1 decomp 9375	v	v	v
B13 W1 decomp 9376	v	v	v
B14 W1 decomp 9377	v	v	v
B15 W1 decomp 9378	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
Diacal active 7367	v	v	v
Dig pad 0 9116	v	v	v
Dig pad 1 9117	v	v	v
Dig pad 2 9118	v	v	v
Dig pad 3 9119	v	v	v
Dig pad 4 9120	v	v	v
Dig pad 5 9121	v	v	v
Dig pad 6 9122	v	v	v
Dig pad 7 9123	v	v	v
Dig pad 8 9124	v	v	v
Dig pad 9 9125	v	v	v
Dig pad 10 9126	v	v	v
Dig pad 11 9127	v	v	v
Dig pad 12 9128	v	v	v
Dig pad 13 9129	v	v	v
Dig pad 14 9130	v	v	v
Dig pad 15 9131	v	v	v

Pick List 18

NULL 4000	v	v	v
ONE 4001	v	v	v
DI 0 Enable mon 4020	v	v	v
DI 1 monitor 4021	v	v	v
DI 2 monitor 4022	v	v	v
DI 3 monitor 4023	v	v	v
DI 4 monitor 4024	v	v	v
DI 5 monitor 4025	v	v	v
DI 6 monitor 4026	v	v	v
DI 7 monitor 4027	v	v	v
DI 0X monitor 4045	v	v	v
DI 1X monitor 4046	v	v	v
DI 2X monitor 4047	v	v	v
DI 3X monitor 4048	v	v	v
DI 4X monitor 4049	v	v	v
DI 5X monitor 4050	v	v	v
DI 6X monitor 4051	v	v	v
DI 7X monitor 4052	v	v	v
DI 8X monitor 4053	v	v	v
DI 9X monitor 4054	v	v	v
DI 10X monitor 4055	v	v	v
DI 11X monitor 4056	v	v	v
B0 W0 decomp 2123	v	v	v
B1 W0 decomp 2124	v	v	v
B2 W0 decomp 2125	v	v	v
B3 W0 decomp 2126	v	v	v
B4 W0 decomp 2127	v	v	v
B5 W0 decomp 2128	v	v	v
B6 W0 decomp 2129	v	v	v
B7 W0 decomp 2130	v	v	v
B8 W0 decomp 2131	v	v	v
B9 W0 decomp 2132	v	v	v
B10 W0 decomp 2133	v	v	v
B11 W0 decomp 2134	v	v	v
B12 W0 decomp 2135	v	v	v
B13 W0 decomp 2136	v	v	v
B14 W0 decomp 2137	v	v	v
B15 W0 decomp 2138	v	v	v
B0 W1 decomp 9363	v	v	v
B1 W1 decomp 9364	v	v	v
B2 W1 decomp 9365	v	v	v
B3 W1 decomp 9366	v	v	v
B4 W1 decomp 9367	v	v	v
B5 W1 decomp 9368	v	v	v
B6 W1 decomp 9369	v	v	v
B7 W1 decomp 9370	v	v	v
B8 W1 decomp 9371	v	v	v
B9 W1 decomp 9372	v	v	v
B10 W1 decomp 9373	v	v	v
B11 W1 decomp 9374	v	v	v
B12 W1 decomp 9375	v	v	v
B13 W1 decomp 9376	v	v	v
B14 W1 decomp 9377	v	v	v
B15 W1 decomp 9378	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
Diacal active 7367	v	v	v
Dig pad 0 9116	v	v	v
Dig pad 1 9117	v	v	v
Dig pad 2 9118	v	v	v
Dig pad 3 9119	v	v	v
Dig pad 4 9120	v	v	v
Dig pad 5 9121	v	v	v
Dig pad 6 9122	v	v	v
Dig pad 7 9123	v	v	v
Dig pad 8 9124	v	v	v
Dig pad 9 9125	v	v	v
Dig pad 10 9126	v	v	v
Dig pad 11 9127	v	v	v
Dig pad 12 9128	v	v	v
Dig pad 13 9129	v	v	v
Dig pad 14 9130	v	v	v
Dig pad 15 9131	v	v	v

Pick List 19

Int SGP ref 3710	v	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v

	V/F	FOC	SLS
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 20

Int spd 0 ref 3721	v	v	v
NULL 4000	v	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v

Pick List 21

Droop comp 2510	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v

	V/F	FOC	SLS
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 22

Int spd fbk sel 1940	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
DI 0 Enable mon 4020	v	v	v
DI 1 monitor 4021	v	v	v
DI 2 monitor 4022	v	v	v
DI 3 monitor 4023	v	v	v
DI 4 monitor 4024	v	v	v
DI 5 monitor 4025	v	v	v
DI 6 monitor 4026	v	v	v
DI 7 monitor 4027	v	v	v
DI 0X monitor 4045	v	v	v
DI 1X monitor 4046	v	v	v
DI 2X monitor 4047	v	v	v
DI 3X monitor 4048	v	v	v
DI 4X monitor 4049	v	v	v
DI 5X monitor 4050	v	v	v
DI 6X monitor 4051	v	v	v
DI 7X monitor 4052	v	v	v
DI 8X monitor 4053	v	v	v
DI 9X monitor 4054	v	v	v
DI 10X monitor 4055	v	v	v
DI 11X monitor 4056	v	v	v
B0 W0 decomp 2123	v	v	v
B1 W0 decomp 2124	v	v	v
B2 W0 decomp 2125	v	v	v
B3 W0 decomp 2126	v	v	v
B4 W0 decomp 2127	v	v	v
B5 W0 decomp 2128	v	v	v
B6 W0 decomp 2129	v	v	v
B7 W0 decomp 2130	v	v	v
B8 W0 decomp 2131	v	v	v
B9 W0 decomp 2132	v	v	v
B10 W0 decomp 2133	v	v	v
B11 W0 decomp 2134	v	v	v
B12 W0 decomp 2135	v	v	v
B13 W0 decomp 2136	v	v	v
B14 W0 decomp 2137	v	v	v
B15 W0 decomp 2138	v	v	v
B0 W1 decomp 9363	v	v	v
B1 W1 decomp 9364	v	v	v
B2 W1 decomp 9365	v	v	v
B3 W1 decomp 9366	v	v	v
B4 W1 decomp 9367	v	v	v
B5 W1 decomp 9368	v	v	v
B6 W1 decomp 9369	v	v	v
B7 W1 decomp 9370	v	v	v
B8 W1 decomp 9371	v	v	v
B9 W1 decomp 9372	v	v	v
B10 W1 decomp 9373	v	v	v
B11 W1 decomp 9374	v	v	v

	V/F	FOC	SLS
B12 W1 decomp 9375	v	v	v
B13 W1 decomp 9376	v	v	v
B14 W1 decomp 9377	v	v	v
B15 W1 decomp 9378	v	v	v
FRC inversion 8081	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
Dig pad 0 9116	v	v	v
Dig pad 1 9117	v	v	v
Dig pad 2 9118	v	v	v
Dig pad 3 9119	v	v	v
Dig pad 4 9120	v	v	v
Dig pad 5 9121	v	v	v
Dig pad 6 9122	v	v	v
Dig pad 7 9123	v	v	v
Dig pad 8 9124	v	v	v
Dig pad 9 9125	v	v	v
Dig pad 10 9126	v	v	v
Dig pad 11 9127	v	v	v
Dig pad 12 9128	v	v	v
Dig pad 13 9129	v	v	v
Dig pad 14 9130	v	v	v
Dig pad 15 9131	v	v	v

Pick List 23

Int SE flx level 3536	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v

	V/F	FOC	SLS
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 24

Int flx maxlim 1120	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v

	V/F	FOC	SLS
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 25

Int Inertia 2054	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v

	V/F	FOC	SLS
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 26

W0 decomp inp 2121	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v

	V/F	FOC	SLS
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A

	V/F	FOC	SLS
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 27

W1 decomp inp 2121	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v

	V/F	FOC	SLS
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 28

Int Drv ISBus W0 9320	v	v	v
Int Drv ISBus W1 9321	v	v	v
Int Drv ISBus W2 9322	v	v	v
Int Drv ISBus W3 9323	v	v	v
Int Drv ISBus W4 9324	v	v	v
Int Drv ISBus W5 9325	v	v	v
Int Drv ISBus W6 9326	v	v	v
Int Drv ISBus W7 9327	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v

	V/F	FOC	SLS
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v

	V/F	FOC	SLS
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 29

Int DrvDGFC-S W0 4105	v	v	v
Int DrvDGFC-S W1 4106	v	v	v
Int DrvDGFC-S W2 4107	v	v	v
Int DrvDGFC-S W3 4108	v	v	v
Int DrvDGFC-S W4 4109	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v

	V/F	FOC	SLS
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 30

Int DrvDGFC-A W0 4140	v	v	v
Int DrvDGFC-A W1 4141	v	v	v

	V/F	FOC	SLS
Int DrvDGFC-A W2 4142	v	v	v
Int DrvDGFC-A W3 4143	v	v	v
Int DrvDGFC-A W4 4144	v	v	v
Int DrvDGFC-A W5 4145	v	v	v
Int DrvDGFC-A W6 4146	v	v	v
Int DrvDGFC-A W7 4147	v	v	v
Int DrvDGFC-A W8 4148	v	v	v
Int DrvDGFC-A W9 4149	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 31

Int PID inp FF 7211	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 32

Int PID fbk 7230	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v

	V/F	FOC	SLS
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 33

	V/F	FOC	SLS
Int PID draw 7231	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v

	V/F	FOC	SLS
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 34

	V/F	FOC	SLS
Int PID set 0 7232	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v

	V/F	FOC	SLS
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 35

Int PID set 1 7232	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v

	V/F	FOC	SLS
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 36

Int PIGP ref 7281	v	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v

	V/F	FOC	SLS
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 37

Int PDGP ref 7311	v	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v

	V/F	FOC	SLS
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Pick List 38			
Int PID Mlt PI 3 7326	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v

	V/F	FOC	SLS
Flux ref 3180	N/A	v	N/A
Flux 3190	N/A	v	N/A
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	v
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v

	V/F	FOC	SLS
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Pick List 39			
Int IS ctrl 9551	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Pick List 40			
Int Drv SBI W0 9020	v	v	v

	V/F	FOC	SLS
Int Drv SBI W1 9021	v	v	v
Int Drv SBI W2 9022	v	N/A	N/A
Int Drv SBI W3 9023	v	v	v
Int Drv SBI W4 9024	v	v	v
Int Drv SBI W5 9025	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v

	V/F	FOC	SLS
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 42

Int Outvlt lim 1140	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v

	V/F	FOC	SLS
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 43

Int SpdTrq mode 2390	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Output voltage 3060	v	v	v
Output current 3070	v	v	v
Output frequency 3080	v	v	v
Output power 3090	v	v	v
DC link voltage 3100	v	v	v
Magnetizing curr 3110	v	v	v
Torque curr 3120	v	v	v
Magn curr ref 3130	N/A	v	v
Torque curr ref 3140	N/A	v	v
Current phase U 3150	v	v	v
Current phase V 3160	v	v	v
Current phase W 3170	v	v	v
Flux ref 3180	N/A	v	v
Flux 3190	N/A	v	v
Ramp ref 3200	v	v	v
Speed ref 3210	v	v	v
Speed 3220	v	v	v
Norm Speed 3221	v	v	v
Fault Pin 9098	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Drv OL accum % 1540	v	v	v
Mot OL accum % 1670	v	v	v
BU OL accum % 1781	v	v	v
Drive ready 161	v	v	v
Enable SM mon 162	v	v	v
Start SM mon 163	v	v	v
FastStop SM mon 164	v	v	v
ALM Sequencer 9096	v	v	v

	V/F	FOC	SLS
Drive OK 9097	v	v	v
Jog state 8013	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
Ramp out mon 8022	v	v	v
Speed draw out 7099	v	v	v
Jog output 8012	v	v	v
Mlt spd out mon 7070	v	v	v
Mpot output mon 7090	v	v	v
I/F cp mon 2625	N/A	v	v
Torque ref 2450	N/A	v	v
Tcurr lim + 1210	v	v	v
Tcurr lim - 1220	v	v	v
Inuse Tcurr lim+ 1250	v	v	v
Inuse Tcurr lim- 1260	v	v	v
Inuse Outvlt ref 1180	N/A	v	v
PL next factor 2282	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v

	V/F	FOC	SLS
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Std enc position 9553	N/A	v	N/A
Exp enc position 9554	N/A	v	N/A
H Index register 9555	N/A	v	N/A
L Index register 9556	N/A	v	N/A

Pick List 44

Int torque ref 3 2447	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
I/F cp mon 2625	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v

	V/F	FOC	SLS
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v

Pick List 45

Int ramp ref 3 7038	v	v	v
NULL 4000	v	v	v
ONE 4001	v	v	v
Gen output 2760	v	v	v
An inp 1 output 5009	v	v	v
An inp 2 output 5029	v	v	v
An inp 3 output 5049	v	v	v
An inp 1X output 5067	v	v	v
An inp 2X output 5087	v	v	v
W0 comp out 2116	v	v	v
W1 comp out 9356	v	v	v
SBI Drv W0 mon 9000	v	v	v
SBI Drv W1 mon 9001	v	v	v
SBI Drv W2 mon 9002	v	v	v
SBI Drv W3 mon 9003	v	v	v
SBI Drv W4 mon 9004	v	v	v
SBI Drv W5 mon 9005	v	v	v
ISBus Drv W0 mon 9300	v	v	v
ISBus Drv W1 mon 9301	v	v	v
ISBus Drv W2 mon 9302	v	v	v
ISBus Drv W3 mon 9303	v	v	v
ISBus Drv W4 mon 9304	v	v	v
ISBus Drv W5 mon 9305	v	v	v
ISBus Drv W6 mon 9306	v	v	v
ISBus Drv W7 mon 9307	v	v	v
DGFC-S Drv W0mon 4120	v	v	v
DGFC-S Drv W1mon 4121	v	v	v
DGFC-S Drv W2mon 4122	v	v	v
DGFC-S Drv W3mon 4123	v	v	v
DGFC-S Drv W4mon 4124	v	v	v
DGFC-A Drv W0mon 4160	v	v	v
DGFC-A Drv W1mon 4161	v	v	v
DGFC-A Drv W2mon 4162	v	v	v
DGFC-A Drv W3mon 4163	v	v	v
DGFC-A Drv W4mon 4164	v	v	v
DGFC-A Drv W5mon 4165	v	v	v
DGFC-A Drv W6mon 4166	v	v	v
DGFC-A Drv W7mon 4167	v	v	v
DGFC-A Drv W8mon 4168	v	v	v
DGFC-A Drv W9mon 4169	v	v	v
PID FF mon 7217	v	v	v
PID input 7256	v	v	v
PID PI out mon 7294	v	v	v
Last PI out 7295	v	v	v
PID PD out mon 7343	v	v	v
PID out mon 7352	v	v	v
PID outS mon 7353	v	v	v
Pad 0 9100	v	v	v
Pad 1 9101	v	v	v
Pad 2 9102	v	v	v
Pad 3 9103	v	v	v
Pad 4 9104	v	v	v
Pad 5 9105	v	v	v
Pad 6 9106	v	v	v
Pad 7 9107	v	v	v
Pad 8 9108	v	v	v
Pad 9 9109	v	v	v
Pad 10 9110	v	v	v
Pad 11 9111	v	v	v
Pad 12 9112	v	v	v
Pad 13 9113	v	v	v
Pad 14 9114	v	v	v
Pad 15 9115	v	v	v
Norm Std enc spd 3222	v	v	v
Norm Exp enc spd 3223	v	v	N/A
Mlt spd output 7070	v	v	v
Mpot output mon 7090	v	v	v

3.2 NUMERIC ORDER PARAMETERS LIST

3.2.1 Numeric Order Parameter List Caption

Ipa

Parameter number.
Index used to enter the parameter via the serial line or the option cards.

Point type

It states the point type.

The format is the following: $AB or $pin

$AB

$ internal identification key

A	can to be	>	**P**	float type
		>	**D**	digital type (Integer with 16 bits)
B	can to be	>	**P**	parameter
		>	**V**	variable
		>	**K**	constant

$PIN

the parameter type is enumerative. It has, therefore, a list of possible values (for example it is a source).

Validity DB

It states the regulation mode in which the parameter is valid.

The reading keys are:

- **F** Field oriented
- **S** Sensorless
- **V** V/f
- **A** Autotuning (Setup mode)
- **B** internal use

Description

Description of the parameter shown on the display.

fs unit (physic unit) Parameter unit of measure.

If N/A appears, it means that the parameter is directly stated with its internal value.

Access mode It shows how the data can be entered

R Read (reading)

W Write (writing)

S Saved in flash

Z it can be entered only when the drive is disabled

Default* Parameter default value.

Min Parameter minimum value*

Minimum value to be set

Max Parameter maximum value*

Maximum value to be set

(*) If a writing is displayed instead of a value, it means that the value depends on the size or on other configuration parameters.

3.2.2 Numeric Order Parameter List

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
98	$PV	FSVABT	Sys time-ddmmyy	hrs/min/sec	R___			
99	$PV	FSVABT	Life time	hrs	R___	0.00F	0.00F	0.00F
100	$DK	F_____	Regulation mode	N/A	R___	2	0	0
100	$DK	_S____	Regulation mode	N/A	R___	3	0	0
100	$DK	_____T	Regulation mode	N/A	R___	6	0	0
100	$DK	____B_	Regulation mode	N/A	R___	5	0	0
100	$DK	___A__	Regulation mode	N/A	R___	4	0	0
100	$DK	__V___	Regulation mode	N/A	R___	1	0	0
105	$DK	FSVABT	SLink4 address	N/A	RWS_	1	0	255
105	$DK	FSVABT	SLink4 address	N/A	RWS_	1	0	255
106	$DK	FSVABT	SLink4 res time	N/A	RWS_	0	0	255
110	$DV	FSVABT	Software type	N/A	R___	DVER	0	0
111	$DV	FSVABT	Software status	N/A	R___	DVER	0	0
114	$DK	FSVABT	Drive size	N/A	R___	DSIZE	0	20
115	$FK	FSVABT	Drive name	NULL	RWS_	0.00F	0.00F	0.00F
115	$FK	FSVABT	Drive name	NULL	RWS_	0.00F	0.00F	0.00F
150	$DV	FSV_B_	Enable cmd mon	N/A	R___	0	0	1
151	$DV	FSV_B_	Start cmd mon	N/A	R___	0	0	1
152	$DV	FSV_B_	FastStop cmd mon	N/A	R___	1	0	1
153	$PIN	FSV_B_	Term StrStp src	N/A	RWS_	4021	LST_016	
154	$PIN	FSV_B_	FastStop src	N/A	RWS_	4000	LST_018	
156	$PIN	FSV_B_	Dig Enable src	N/A	RWS_	4000	LST_017	
157	$PIN	FSV_B_	Dig StrStp src	N/A	RWS_	4000	LST_018	
162	$DV	FSVABT	Enable SM mon	N/A	R___	0	0	1
163	$DV	FSV_B_	Start SM mon	N/A	R___	0	0	1
164	$DV	FSV_B_	FastStop SM mon	N/A	R___	0	0	1
170	$DK	FSVABT	Switching freq	N/A	RW__	DSIZE	0	3
300	$DK	FSVABT	Drive type	N/A	R___	288	0	0
380	$DK	FSVABT	Mains voltage	N/A	RW__	2	0	5
530	$PP	FSVABT	Dead time limit	V	RWS_	SIZE	0.00F	50.00F
540	$PP	FSVABT	Dead time slope	V_A	RWS_	SIZE	0.00F	100.00F
560	$PP	FSVABT	Hw deadtime comp	us	RWS_	SIZE	0.00F	20.00F
570	$DP	FSVABT	Hw deadtime mode	N/A	RWS_	0	0	3
670	$FK	FSVABT	Rated voltage	V	RW__	MOTR	CALC	CALC
680	$FK	FSVABT	Rated frequency	Hz	RW__	MOTR	5.00F	CALC
690	$FK	FSVABT	Rated current	A	RW__	MOTR	CALC	CALC
700	$FK	FSVABT	Rated speed	rpm	RW__	MOTR	10.00F	CALC
710	$FK	FSVABT	Rated power	kW	RW__	MOTR	0.00F	CALC
720	$FK	FSVA__	Cosfi	NULL	RW__	MOTR	0.50F	0.99F
730	$FK	FSVA__	Efficiency	%	RW__	MOTR	50.00F	99.00F
810	$DK	FSVABT	Actual setup	N/A	R___	0	0	0
950	$PP	FS____	Rotor resistance	Ohm	RW__	CALC	0.00F	0.00F
950	$FK	__VA__	Rotor resistance	Ohm	RW__	CALC	0.00F	0.00F
970	$PP	_S____	Stator resist	Ohm	RW__	CALC	0.00F	0.00F
970	$FK	F_VABT	Stator resist	Ohm	RW__	0.00F	0.00F	0.00F
1085	$PV	_S____	Inuse Sls P gain	%	R___	0.00F	0.00F	0.00F
1086	$PV	_S____	Inuse Sls I gain	%	R___	0.00F	0.00F	0.00F
1090	$PP	_S____	Sls mot HPgain	%	RWS_	5.00F	0.00F	100.00F
1091	$PP	_S____	Sls mot HIgain	%	RWS_	5.00F	0.00F	CALC
1092	$PP	_S____	Sls mot MPgain	%	RWS_	5.00F	0.00F	100.00F
1093	$PP	_S____	Sls mot MIgain	%	RWS_	5.00F	0.00F	CALC
1094	$PP	_S____	Sls mot LPgain	%	RWS_	1.00F	0.00F	100.00F
1095	$PP	_S____	Sls mot LIgain	%	RWS_	0.00F	0.00F	CALC
1096	$PP	_S____	Sls H/M tran lev	rpm	RWS_	CALC	0.00F	CALC
1097	$PP	_S____	Sls M/L tran lev	rpm	RWS_	CALC	0.00F	CALC
1098	$PP	_S____	Sls H/M tran bnd	rpm	RWS_	CALC	0.00F	CALC
1099	$PP	_S____	Sls M/L tran bnd	rpm	RWS_	CALC	0.00F	CALC
1101	$PP	_S____	Sls regen HPgain	%	RWS_	5.00F	0.00F	100.00F
1102	$PP	_S____	Sls regen HIgain	%	RWS_	5.00F	0.00F	CALC
1103	$PP	_S____	Sls regen MPgain	%	RWS_	5.00F	0.00F	100.00F

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
1104	$PP	_S____	Sls regen MIgain	%	RWS_	5.00F	0.00F	CALC
1105	$PP	_S____	Sls regen LPgain	%	RWS_	1.00F	0.00F	100.00F
1106	$PP	_S____	Sls regen LIgain	%	RWS_	0.00F	0.00F	CALC
1107	$PP	_S____	Sls 0 tran bnd	rpm	RWS_	CALC	0.00F	CALC
1111	$PP	_S____	Observer filter	ms	RWS_	100.00F	CALC	CALC
1112	$PP	_S____	Observer ref mon	rpm	R___	0.00F	0.00F	0.00F
1120	$PV	FS____	Int flx maxlim	%	RWS_	100.00F	60.00F	CALC
1120	$PV	____B_	Int flx maxlim	%	RWS_	0.00F	0.00F	0.00F
1121	$PIN	FS__B_	Flux level src	N/A	RWS_	1120	LST_024	
1130	$PV	FS__B_	Dyn vlt margin	%	RWS_	2.00F	1.00F	10.00F
1140	$PV	FS__B_	Int Outvlt lim	V	RWS_	CALC	CALC	CALC
1141	$PIN	FS__B_	Outvlt lim src	N/A	RWS_	1140	LST_042	
1150	$PV	FS____	Inuse flx maxlim	%	R___	0.00F	0.00F	0.00F
1170	$PV	FS__B_	Available Outvlt	V	R___	0.00F	0.00F	0.00F
1180	$PV	FS__B_	Inuse Outvlt ref	V	R___	0.00F	0.00F	0.00F
1190	$DV	FS__B_	Tcurr lim sel	N/A	RWS_	0	0	4
1190	$DV	__V___	Tcurr lim sel	N/A	RWS_	0	0	2
1210	$PV	FSV_B_	Tcurr lim +	A	RWS_	CALC	0.00F	CALC
1220	$PV	FSV_B_	Tcurr lim -	A	RWS_	CALC	0.00F	CALC
1250	$PV	FSV_B_	Inuse Tcurr lim+	A	R___	0.00F	0.00F	0.00F
1260	$PV	FSV_B_	Inuse Tcurr lim-	A	R___	0.00F	0.00F	0.00F
1310	$PV	FS__B_	Max regen power	kW	RWS_	CALC	0.00F	CALC
1350	$DK	FSVABT	Ambient temp	N/A	RW__	0	0	1
1460	$FK	___A_T	Drive cont curr	A	RW__	CALC	0.00F	0.00F
1460	$PP	FSV_B_	Drive cont curr	A	RW__	CALC	0.00F	0.00F
1540	$PV	FSV_B_	Drv OL accum %	%	R___	0.00F	0.00F	0.00F
1610	$FK	FSV_B_	Motor OL factor	NULL	RW__	1.50F	1.20F	5.00F
1611	$FK	FSV_B_	Service factor	NULL	RW__	1.00F	0.50F	1.50F
1650	$FK	FSV_B_	Motor OL time	s	RW__	60.00F	10.00F	CALC
1670	$PV	FSV_B_	Mot OL accum %	%	R___	0.00F	0.00F	0.00F
1700	$DP	FSV_B_	BU control	N/A	RW__	0	0	2
1710	$FK	FSV_B_	BU res cont pwr	kW	RW__	SIZE	0.00F	0.00F
1720	$FK	FSV_B_	BU res OL time	s	RW__	SIZE	1.00F	1000.00F
1730	$FK	FSV_B_	BU res OL factor	NULL	RW__	SIZE	1.20F	20.00F
1740	$FK	FSV_B_	BU resistance	Ohm	RW__	SIZE	CALC	10000.0F
1781	$PV	FSV_B_	BU OL accum %	%	R___	0.00F	0.00F	0.00F
1810	$PP	FS____	Magn ramp time	s	RWS_	SIZE	0.01F	5.00F
1815	$DP	____B_	Lock flux pos	N/A	WS_Z	0	0	0
1815	$DP	_S____	Lock flux pos	N/A	WS_Z	1	0	3
1815	$DP	F_V___	Lock flux pos	N/A	WS_Z	0	0	3
1832	$DP	FSV___	DCbrake mode	N/A	WS_Z	0	0	1
1832	$DK	____B_	DCbrake mode	N/A	W__Z	0	0	0
1833	$PP	FSV___	DCbrake delay	s	RWS_	0.50F	0.02F	30.00F
1834	$PP	FSV___	DCbrake duration	s	RWS_	1.00F	0.02F	30.00F
1835	$PP	FSV___	DCbrake current	%	RWS_	50.00F	0.00F	100.00F
1836	$DK	____B_	DCbrake cmd src	N/A	RW__	0	0	0
1836	$PIN	FSV___	DCbrake cmd src	N/A	RWS_	4000	LST_003	
1837	$DV	FSV___	DCbrake state	N/A	R___	0	0	1
1840	$DP	FS____	VoltageFwdEnable	N/A	RWS_	1	0	1
1862	$DP	F___B_	InvDecEnable	N/A	RWS_	0	0	1
1880	$DK	FSVABT	Spd ref/fbk res	N/A	RW__	1	0	2
1885	$PV	FSV_B_	Full scale speed	rpm	RW__	CSD	CALC	CALC
1885	$PV	FSV_B_	Full scale speed	rpm	RW__	CSD	CALC	CALC
1890	$FK	FSV_B_	Std enc pulses	ppr	RW__	1024.00F	CALC	CALC
1900	$FK	F_V_B_	Exp enc pulses	ppr	RW__	1024.00F	CALC	CALC
1902	$FK	F_V_B_	Std sin enc Vp	V	RW__	0.50F	0.00F	1.50F
1925	$DK	FSV___	Std enc type	N/A	RW__	0	0	2
1925	$DK	____B_	Std enc type	N/A	RW__	3	3	9
1926	$DK	F_V_B_	Exp enc type	N/A	RW__	1	1	2
1927	$DP	FSV_B_	Std enc supply	N/A	RW__	0	0	3

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
1931	$DP	FSV_B_	Std dig enc mode	N/A	RW__	0	0	1
1936	$PP	____B_	Motor pp/sens pp	NULL	RW__	CALC	CALC	32.00F
1940	$DV	F_V_B_	Int spd fbk sel	N/A	RW__	0	0	1
1952	$PP	____B_	Sim enc pulses	ppr	RW__	1024.00F	1.00F	CALC
1962	$DK	F_V___	Rep/Sim enc sel	N/A	RW__	0	0	1
1962	$DK	____B_	Rep/Sim enc sel	N/A	RW__	0	0	2
1999	$PP	FSVABT	CurrP gain %	%	RWS_	CALC	0.00F	100.00F
2000	$PP	FSVABT	CurrI gain %	%	RWS_	CALC	0.00F	100.00F
2005	$FK	FSVABT	CurrP base value	V_A	RWS_	CALC	0.00F	CALC
2007	$FK	FSVABT	CurrI base value	V_A_s	RWS_	CALC	0.00F	CALC
2013	$PP	FS____	FlxP gain %	%	RWS_	CALC	0.00F	100.00F
2015	$PP	FS____	FlxI gain %	%	RWS_	CALC	0.00F	100.00F
2021	$FK	FS____	FlxP base value	A_Wb	RWS_	CALC	0.00F	CALC
2023	$FK	FS____	FlxI base value	A_Wb_s	RWS_	CALC	0.00F	CALC
2031	$PP	FS__B_	VltP gain %	%	RWS_	CALC	0.00F	100.00F
2033	$PP	FS__B_	VltI gain %	%	RWS_	CALC	0.00F	100.00F
2039	$FK	____B_	VltP base value	A/V	RWS_	CALC	0.00F	0.00F
2039	$FK	FS____	VltP base value	Wb_V	RWS_	CALC	0.00F	0.00F
2041	$FK	____B_	VltI base value	A_V_s	RWS_	CALC	0.00F	0.00F
2041	$FK	FS____	VltI base value	Wb_V_s	RWS_	CALC	0.00F	0.00F
2048	$DK	FS__B_	Calc method		RW__	0	0	1
2049	$FK	FS__B_	Bandwidth	rad/s	RW__	50.00F	1.00F	300.00F
2052	$PV	FS__B_	Int Friction	Nm	RWS__	0.00F	0.00F	CALC
2054	$PV	FS__B_	Int Inertia	kgm2	RWS__	0.00F	0.00F	CALC
2063	$PV	FS__B_	InUse SpdP gain%	%	R___	10.00F	0.00F	100.00F
2065	$PV	FS__B_	InUse SpdI gain%	%	R___	10.00F	0.00F	100.00F
2075	$FK	FS__B_	SpdP base value	A_rpm	RWS_	CALC	0.00F	0.00F
2077	$FK	FS__B_	SpdI base value	A_rpm_	RWS_	CALC	0.00F	CALC
2100	$PIN	____B_	Word0 B0 src	N/A	RWS_	4000	LST_001_B	
2100	$PIN	__V___	Word0 B0 src	N/A	RWS_	4000	LST_001_V	
2100	$PIN	F_____	Word0 B0 src	N/A	RWS_	4000	LST_001_F	
2100	$PIN	_S____	Word0 B0 src	N/A	RWS_	4000	LST_001_S	
2101	$PIN	__V___	Word0 B1 src	N/A	RWS_	4000	LST_001_V	
2101	$PIN	____B_	Word0 B1 src	N/A	RWS_	4000	LST_001_B	
2101	$PIN	F_____	Word0 B1 src	N/A	RWS_	4000	LST_001_F	
2101	$PIN	_S____	Word0 B1 src	N/A	RWS_	4000	LST_001_S	
2102	$PIN	F_____	Word0 B2 src	N/A	RWS_	4000	LST_001_F	
2102	$PIN	__V___	Word0 B2 src	N/A	RWS_	4000	LST_001_V	
2102	$PIN	____B_	Word0 B2 src	N/A	RWS_	4000	LST_001_B	
2102	$PIN	_S____	Word0 B2 src	N/A	RWS_	4000	LST_001_S	
2103	$PIN	__V___	Word0 B3 src	N/A	RWS_	4000	LST_001_V	
2103	$PIN	_S____	Word0 B3 src	N/A	RWS_	4000	LST_001_S	
2103	$PIN	F_____	Word0 B3 src	N/A	RWS_	4000	LST_001_F	
2103	$PIN	____B_	Word0 B3 src	N/A	RWS_	4000	LST_001_B	
2104	$PIN	____B_	Word0 B4 src	N/A	RWS_	4000	LST_001_B	
2104	$PIN	_S____	Word0 B4 src	N/A	RWS_	4000	LST_001_S	
2104	$PIN	F_____	Word0 B4 src	N/A	RWS_	4000	LST_001_F	
2104	$PIN	__V___	Word0 B4 src	N/A	RWS_	4000	LST_001_V	
2105	$PIN	____B_	Word0 B5 src	N/A	RWS_	4000	LST_001_B	
2105	$PIN	__V___	Word0 B5 src	N/A	RWS_	4000	LST_001_V	
2105	$PIN	_S____	Word0 B5 src	N/A	RWS_	4000	LST_001_S	
2105	$PIN	F_____	Word0 B5 src	N/A	RWS_	4000	LST_001_F	
2106	$PIN	__V___	Word0 B6 src	N/A	RWS_	4000	LST_001_V	
2106	$PIN	F_____	Word0 B6 src	N/A	RWS_	4000	LST_001_F	
2106	$PIN	_S____	Word0 B6 src	N/A	RWS_	4000	LST_001_S	
2106	$PIN	____B_	Word0 B6 src	N/A	RWS_	4000	LST_001_B	
2107	$PIN	_S____	Word0 B7 src	N/A	RWS_	4000	LST_001_S	
2107	$PIN	__V___	Word0 B7 src	N/A	RWS_	4000	LST_001_V	
2107	$PIN	____B_	Word0 B7 src	N/A	RWS_	4000	LST_001_B	
2107	$PIN	F_____	Word0 B7 src	N/A	RWS_	4000	LST_001_F	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
2108	$PIN	____B_	Word0 B8 src	N/A	RWS_	4000	LST_001_B	
2108	$PIN	F_____	Word0 B8 src	N/A	RWS_	4000	LST_001_F	
2108	$PIN	_S____	Word0 B8 src	N/A	RWS_	4000	LST_001_S	
2108	$PIN	__V___	Word0 B8 src	N/A	RWS_	4000	LST_001_V	
2109	$PIN	____B_	Word0 B9 src	N/A	RWS_	4000	LST_001_B	
2109	$PIN	__V___	Word0 B9 src	N/A	RWS_	4000	LST_001_V	
2109	$PIN	_S____	Word0 B9 src	N/A	RWS_	4000	LST_001_S	
2109	$PIN	F_____	Word0 B9 src	N/A	RWS_	4000	LST_001_F	
2110	$PIN	_S____	Word0 B10 src	N/A	RWS_	4000	LST_001_S	
2110	$PIN	F_____	Word0 B10 src	N/A	RWS_	4000	LST_001_F	
2110	$PIN	____B_	Word0 B10 src	N/A	RWS_	4000	LST_001_B	
2110	$PIN	__V___	Word0 B10 src	N/A	RWS_	4000	LST_001_V	
2111	$PIN	____B_	Word0 B11 src	N/A	RWS_	4000	LST_001_B	
2111	$PIN	F_____	Word0 B11 src	N/A	RWS_	4000	LST_001_F	
2111	$PIN	_S____	Word0 B11 src	N/A	RWS_	4000	LST_001_S	
2111	$PIN	__V___	Word0 B11 src	N/A	RWS_	4000	LST_001_V	
2112	$PIN	____B_	Word0 B12 src	N/A	RWS_	4000	LST_001_B	
2112	$PIN	__V___	Word0 B12 src	N/A	RWS_	4000	LST_001_V	
2112	$PIN	F_____	Word0 B12 src	N/A	RWS_	4000	LST_001_F	
2112	$PIN	_S____	Word0 B12 src	N/A	RWS_	4000	LST_001_S	
2113	$PIN	_S____	Word0 B13 src	N/A	RWS_	4000	LST_001_S	
2113	$PIN	F_____	Word0 B13 src	N/A	RWS_	4000	LST_001_F	
2113	$PIN	__V___	Word0 B13 src	N/A	RWS_	4000	LST_001_V	
2113	$PIN	____B_	Word0 B13 src	N/A	RWS_	4000	LST_001_B	
2114	$PIN	F_____	Word0 B14 src	N/A	RWS_	4000	LST_001_F	
2114	$PIN	_S____	Word0 B14 src	N/A	RWS_	4000	LST_001_S	
2114	$PIN	__V___	Word0 B14 src	N/A	RWS_	4000	LST_001_V	
2114	$PIN	____B_	Word0 B14 src	N/A	RWS_	4000	LST_001_B	
2115	$PIN	____B_	Word0 B15 src	N/A	RWS_	4000	LST_001_B	
2115	$PIN	__V___	Word0 B15 src	N/A	RWS_	4000	LST_001_V	
2115	$PIN	F_____	Word0 B15 src	N/A	RWS_	4000	LST_001_F	
2115	$PIN	_S____	Word0 B15 src	N/A	RWS_	4000	LST_001_S	
2116	$DV	FSV_B_	W0 comp out	N/A	R___	0	0	0xffff
2120	$PIN	F_____	W0 decomp src	N/A	RWS_	2121	LST_026_F	
2120	$PIN	_S____	W0 decomp src	N/A	RWS_	2121	LST_026_S	
2120	$PIN	__V___	W0 decomp src	N/A	RWS_	2121	LST_026_V	
2120	$PIN	____B_	W0 decomp src	N/A	RWS_	2121	LST_026_B	
2121	$DV	FSV_B_	W0 decomp inp	N/A	RWS_	0	0	0xffff
2122	$DP	FSV_B_	W0 decomp mon	N/A	R___	0	0	0xffff
2123	$DV	FSV_B_	B0 W0 decomp	N/A	R___	0	0	1
2124	$DV	FSV_B_	B1 W0 decomp	N/A	R___	0	0	1
2125	$DV	FSV_B_	B2 W0 decomp	N/A	R___	0	0	1
2126	$DV	FSV_B_	B3 W0 decomp	N/A	R___	0	0	1
2127	$DV	FSV_B_	B4 W0 decomp	N/A	R___	0	0	1
2128	$DV	FSV_B_	B5 W0 decomp	N/A	R___	0	0	1
2129	$DV	FSV_B_	B6 W0 decomp	N/A	R___	0	0	1
2130	$DV	FSV_B_	B7 W0 decomp	N/A	R___	0	0	1
2131	$DV	FSV_B_	B8 W0 decomp	N/A	R___	0	0	1
2132	$DV	FSV_B_	B9 W0 decomp	N/A	R___	0	0	1
2133	$DV	FSV_B_	B10 W0 decomp	N/A	R___	0	0	1
2134	$DV	FSV_B_	B11 W0 decomp	N/A	R___	0	0	1
2135	$DV	FSV_B_	B12 W0 decomp	N/A	R___	0	0	1
2136	$DV	FSV_B_	B13 W0 decomp	N/A	R___	0	0	1
2137	$DV	FSV_B_	B14 W0 decomp	N/A	R___	0	0	1
2138	$DV	FSV_B_	B15 W0 decomp	N/A	R___	0	0	1
2270	$PP	FS__B_	PLR P gain	A/V	RWS_	CALC	0.00F	CALC
2275	$DV	FSV_B_	PLS active	N/A	R___	0	0	1
2280	$PP	FS__B_	PLR I gain	A_V_s	RWS_	CALC	0.00F	CALC
2282	$PV	FSV_B_	PL next factor	%	R___	0.00F	0.00F	0.00F
2283	$DV	FSV_B_	PL next active	N/A	R___	0	0	0

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
2284	$DV	FS__B_	PLR active	N/A	R___	0	0	1
2295	$PP	FS__B_	VdcCtrl P gain	A/V	RWS_	CALC	0.00F	CALC
2296	$PP	FS__B_	VdcCtrl I gain	A_V_s	RWS_	CALC	0.00F	CALC
2300	$DV	__V___	PL function sel	N/A	WS_Z	0	0	1
2300	$DV	FS__B_	PL function sel	N/A	WS_Z	0	0	2
2302	$PV	FSV_B_	PL acceleration	rpm_s	RWS_	100.00F	1.00F	CALC
2304	$PV	FSV_B_	PL deceleration	rpm_s	RWS_	10000.00F	1.00F	CALC
2312	$PIN	FSV_B_	PLS mains st src	N/A	RWS_	4000	LST_003	
2320	$PP	FSV_B_	PLS timeout	s	RWS_	10.00F	0.00F	1000.00F
2330	$PV	FSV_B_	PLS curr lim	A	RWS_	CALC	0.00F	0.00F
2340	$PP	FSV_B_	PLS Vdc ref	V	RWS_	CALC	0.00F	820.00F
2360	$PP	FSV_B_	PLS P gain	A/V	RWS_	CALC	0.00F	CALC
2370	$PP	FSV_B_	PLS I gain	A_V_s	RWS_	CALC	0.00F	CALC
2380	$PP	FS__B_	Prop filter	ms	RWS_	0.20F	0.15F	1000.00F
2385	$PIN	FS__B_	SpdTrq mode src	N/A	RWS_	2390	LST_043	
2390	$DV	FS__B_	Int SpdTrq mode	N/A	RWS_	0	0	5
2430	$PV	FS__B_	Int torque ref 1	Nm	RWS_	0.00F	CALC	CALC
2431	$PIN	FS__B_	Torque ref 1 src	N/A	RWS_	2430	LST_014	
2432	$PP	FS__B_	Torque ref 1 mon	Nm	R___	0.00F	0.00F	0.00F
2440	$PV	FS__B_	Int torque ref 2	Nm	RWS_	0.00F	CALC	CALC
2441	$PIN	FS__B_	Torque ref 2 src	N/A	RWS_	2440	LST_015	
2442	$PP	FS__B_	Torque ref 2 mon	Nm	R___	0.00F	0.00F	0.00F
2445	$DV	FSV_B_	Tcurr lim state	N/A	R___	0	0	1
2446	$DV	FS__B_	SpdTrq ctrl stat	N/A	R___	0	0	1
2447	$PV	FS__B_	Int torque ref 3	Nm	RWS_	0.00F	CALC	CALC
2448	$DP	FS__B_	SpdTrq mode mon	N/A	R___	0	0	0
2449	$PIN	FS__B_	Torque ref 3 src	N/A	RWS_	2447	LST_044	
2450	$PV	FS__B_	Torque ref	Nm	R___	0.00F	0.00F	0.00F
2451	$PIN	FS__B_	Zero torque src	N/A	RWS_	4000	LST_003	
2452	$DV	FS__B_	Zero torque mon	N/A	R___	0	0	1
2470	$PIN	FS__B_	Droop en src	N/A	RWS_	4000	LST_003	
2475	$PIN	FS__B_	Droop comp src	N/A	RWS_	2510	LST_021	
2480	$PV	FS__B_	Droop gain	%	RWS_	0.00F	0.00F	100.00F
2490	$PP	FS__B_	Droop filter	ms	RWS_	20.00F	CALC	1000.00F
2500	$PV	FS__B_	Droop limit	rpm	RWS_	50.00F	0.00F	CALC
2510	$PV	FS__B_	Droop comp	Nm	RWS_	0.00F	0.00F	0.00F
2515	$PV	FS__B_	Droop out	rpm	R___	0.00F	0.00F	0.00F
2530	$DV	FS__B_	Sfbk der enable	N/A	WS_Z	0	0	1
2540	$PV	FS__B_	Sfbk der gain	%	RWS_	0.00F	-100.00F	100.00F
2550	$FK	FS__B_	Sfbk der base	ms	RWS_	10000.00F	0.00F	10000.0F
2560	$PP	FS__B_	Sfbk der filter	ms	RWS_	5.00F	0.00F	1000.00F
2580	$PIN	FS__B_	I/F cp en src	N/A	RWS_	4000	LST_003	
2590	$PP	FS__B_	Inertia cp flt	ms	RWS_	30.00F	0.00F	1000.00F
2600	$FK	FS__B_	Calc Frict	Nm	RW__	SIZE	0.00F	0.00F
2605	$PIN	FS__B_	Inertia src	N/A	RWS_	2610	LST_025	
2610	$FK	FS__B_	Calc Inertia	kgm2	RW__	SIZE	0.00F	0.00F
2625	$PV	FS__B_	I/F cp mon	Nm	R___	0.00F	0.00F	0.00F
2745	$PV	FSV_B_	Gen Hi ref	cnt	RWS_	0.0F	INT_MIN	INT_MAX
2750	$PV	FSV_B_	Gen Low ref	cnt	RWS_	0.0F	INT_MIN	INT_MAX
2755	$PV	FSV_B_	Gen Period	s	RWS_	10.00F	0.00F	10000.0F
2756	$DK	FSV_B_	Test gen mode	N/A	RWS_	0	0	0
2760	$PV	FSV_B_	Gen output	cnt	R___	0.00F	0.00F	0.00F
2780	$FK	FSVABT	Measured Rs	Ohm	RW__	CALC	CALC	CALC
2790	$FK	FSVABT	Measured DTL	V	RW__	CALC	0.00F	50.00F
2800	$FK	FSVABT	Measured DTS	Ohm	RW__	CALC	0.00F	100.00F
2810	$FK	FSVABT	Measured LsSigma	H	RW__	CALC	CALC	CALC
2820	$FK	FSVA__	Measured Rr	Ohm	RW__	CALC	CALC	CALC
2830	$FK	FSVA__	Measured Rr2	Ohm	RW__	CALC	CALC	CALC
2840	$FK	FSVA__	Measured P1 flux	NULL	RW__	CALC	0.00F	1.00F
2850	$FK	FSVA__	Measured P2 flux	NULL	RW__	CALC	3.00F	18.00F

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
2860	$FK	FSVA__	Measured P3 flux	NULL	RW__	CALC	0.00F	1.00F
2870	$FK	FSVA__	Measured ImNom	A	RW__	CALC	0.00F	0.00F
2880	$FK	FSVA__	Measured ImMax	A	RW__	CALC	0.00F	0.00F
2890	$FK	FSVA__	Measured FluxNom	Wb	RW__	CALC	0.00F	0.00F
2900	$FK	FSVA__	Measured FluxMax	Wb	RW__	CALC	0.00F	0.00F
3060	$PV	FSVABT	Output voltage	V	R___	0.00F	0.00F	0.00F
3070	$PV	FSVABT	Output current	A	R___	0.00F	0.00F	0.00F
3080	$PV	FSV_B_	Output frequency	Hz	R___	0.00F	0.00F	0.00F
3090	$PV	FS____	Output power	kW	R___	0.00F	0.00F	0.00F
3090	$PV	__V_B_	Output power	kVA	R___	0.00F	0.00F	0.00F
3100	$PV	FSVABT	DC link voltage	V	R___	0.00F	0.00F	0.00F
3110	$PV	FSVABT	Magnetizing curr	A	R___	0.00F	0.00F	0.00F
3120	$PV	FSVABT	Torque curr	A	R___	0.00F	0.00F	0.00F
3130	$PV	FS_ABT	Magn curr ref	A	RW__	0.00F	0.00F	0.00F
3140	$PV	FS__B_	Torque curr ref	A	R___	0.00F	0.00F	0.00F
3180	$PV	FS____	Flux ref	Wb	R___	0.00F	0.00F	0.00F
3190	$PV	FS____	Flux	Wb	R___	0.00F	0.00F	0.00F
3200	$PV	FSV_B_	Ramp ref	rpm	R___	0.00F	0.00F	0.00F
3210	$PV	FSVAB_	Speed ref	rpm	RW__	0.00F	0.00F	0.00F
3220	$PV	FSV_B_	Speed	rpm	R___	0.00F	0.00F	0.00F
3222	$PV	FSV_B_	Norm Std enc spd	rpm	R___	0.00F	0.00F	0.00F
3223	$PV	F_V_B_	Norm Exp enc spd	rpm	R___	0.00F	0.00F	0.00F
3230	$PV	FSVABT	CPU1 runtime	%	R___	0.00F	0.00F	0.00F
3240	$PP	FSVABT	CPU2 runtime	%	R___	0.00F	0.00F	0.00F
3400	$PV	__V___	Voltage boost	%	RWS_	CALC	0.00F	0.00F
3410	$DP	__V___	V/f shape	N/A	RW__	0	0	3
3420	$FK	__V___	V/f voltage	V	RW__	MOTR	CALC	CALC
3430	$FK	__V___	V/f frequency	Hz	RW__	MOTR	5.00F	CALC
3520	$PP	__V___	V/f ILim P gain	rpm_A	RWS_	CALC	CALC	CALC
3530	$PP	__V___	V/f ILim I gain	rpm_A_	RWS_	CALC	CALC	CALC
3531	$PV	__V___	Slip comp	rpm	RWS_	CALC	0.00F	CALC
3536	$PV	__V___	Int SE flx level	%	RWS_	100.00F	10.00F	100.00F
3537	$PP	__V___	SE flx ramp time	s	RWS_	10.00F	0.00F	100.00F
3538	$PIN	__V___	SE cmd src	N/A	RWS_	4000	LST_003	
3539	$PIN	__V___	SE flx level src	N/A	RWS_	3536	LST_023	
3541	$PP	__V___	Slip comp filter	s	RWS_	1.00F	CALC	10.00F
3545	$PP	__V___	Spd search time	s	RWS_	10.00F	0.01F	30.00F
3550	$PP	__V___	Vlt search time	s	RWS_	1.00F	0.01F	20.00F
3555	$PP	__V___	Catch init speed	rpm	RWS_	CALC	0.00F	0.00F
3560	$PP	__V___	Catch demag dly	s	RWS_	3.00F	0.00F	10.00F
3565	$PP	__V___	Catch retry dly	s	RWS_	3.00F	0.00F	10.00F
3570	$PIN	__V___	An out 1 src	N/A	RWS_	4000	LST_002_V	
3570	$PIN	_S____	An out 1 src	N/A	RWS_	4000	LST_002_S	
3570	$PIN	___A__	An out 1 src	N/A	RWS_	4000	LST_002_A	
3570	$PIN	F_____	An out 1 src	N/A	RWS_	4000	LST_002_F	
3570	$PIN	____B_	An out 1 src	N/A	RWS_	4000	LST_002_B	
3570	$PIN	_____T	An out 1 src	N/A	RWS_	4000	LST_002_T	
3572	$DV	__V___	Vlt search state	N/A	R___	0	0	3
3580	$PIN	F_____	An out 2 src	N/A	RWS_	4000	LST_002_F	
3580	$PIN	____B_	An out 2 src	N/A	RWS_	4000	LST_002_B	
3580	$PIN	_S____	An out 2 src	N/A	RWS_	4000	LST_002_S	
3580	$PIN	_____T	An out 2 src	N/A	RWS_	4000	LST_002_T	
3580	$PIN	___A__	An out 2 src	N/A	RWS_	4000	LST_002_A	
3580	$PIN	__V___	An out 2 src	N/A	RWS_	4000	LST_002_V	
3582	$PIN	__V___	V/f catch cmd	N/A	RWS_	4000	LST_003	
3585	$PP	__V___	Antioscill gain	%	RWS_	0.00F	0.00F	100.00F
3630	$DK	____B_	Adapt enable	N/A	RWS_	0	0	0
3630	$DP	F_____	Adapt enable	N/A	RWS_	1	0	1
3630	$DP	_S____	Adapt enable	N/A	RWS_	0	0	1
3640	$PP	F_____	Rr init value	Ohm	RWS_	CALC	0.00F	0.00F

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
3640	$PP	_S____	Rr init value	Ohm	RWS_	CALC	0.00F	0.00F
3645	$PP	_S____	Rs init value	Ohm	RWS_	CALC	0.00F	0.00F
3650	$PP	F_____	Adapt gain Rr	cnt	RWS_	60.00F	0.00F	0.00F
3650	$PP	_S____	Adapt gain Rr	cnt	RWS_	120.00F	0.00F	0.00F
3652	$PP	_S____	Adapt gain Rs	cnt	RWS_	120.00F	0.00F	0.00F
3680	$PP	F_____	Power adapt on	%	RWS_	10.00F	0.00F	100.00F
3682	$PP	_S____	Itrq adapt on	%	RWS_	30.00F	0.00F	100.00F
3684	$PP	_S____	Speed adapt off	rpm	RWS_	CALC	0.00F	0.00F
3685	$PP	F_____	Flx ref adapt on	Wb	R___	CALC	0.00F	0.00F
3700	$PP	FS__B_	SpdP1 gain %	%	RWS_	CALC	0.00F	100.00F
3701	$PP	FS__B_	SpdI1 gain %	%	RWS_	CALC	0.00F	100.00F
3702	$PP	FS__B_	SpdP2 gain %	%	RWS_	CALC	0.00F	100.00F
3703	$PP	FS__B_	SpdI2 gain %	%	RWS_	CALC	0.00F	100.00F
3704	$PP	FS__B_	SpdP3 gain %	%	RWS_	CALC	0.00F	100.00F
3705	$PP	FS__B_	SpdI3 gain %	%	RWS_	CALC	0.00F	100.00F
3706	$PP	FS__B_	SGP tran21 h thr	%	RWS_	0.00F	0.00F	100.00F
3707	$PP	FS__B_	SGP tran32 l thr	%	RWS_	0.00F	0.00F	100.00F
3708	$PP	FS__B_	SGP tran21 band	%	RWS_	0.00F	0.00F	100.00F
3709	$PP	FS__B_	SGP tran32 band	%	RWS_	0.00F	0.00F	100.00F
3710	$PV	FS__B_	Int SGP ref	cnt	RWS_	0.00F	INT_MIN	INT_MAX
3711	$PP	FS__B_	SGP base value	cnt	RWS_	16384.00F	0.00F	16384.0F
3712	$PP	FS__B_	SGP ref mon	cnt	R___	0.00F	0.00F	0.00F
3713	$PIN	FS__B_	SGP ref src	N/A	RWS_	3710	LST_019	
3720	$DP	FSV_B_	Spd 0 enable	N/A	RWS_	0	0	1
3721	$PV	FSV_B_	Int spd 0 ref	cnt	RWS_	0.00F	0.00F	0.00F
3722	$PP	FS__B_	Spd 0 P gain %	%	RWS_	CALC	0.00F	100.00F
3723	$PP	FS__B_	Spd 0 I gain %	%	RWS_	CALC	0.00F	100.00F
3724	$PP	FSV_B_	Spd 0 speed thr	rpm	RWS_	20.00F	0.00F	0.00F
3725	$PP	FSV_B_	Spd 0 spd delay	ms	RWS_	500.00F	0.00F	30000.0F
3726	$PP	FSV_B_	Spd 0 ref thr	rpm	RWS_	20.00F	0.00F	0.00F
3727	$PP	FSV_B_	Spd 0 ref delay	ms	RWS_	1000.00F	0.00F	30000.0F
3728	$DV	FSV_B_	Spd is zero	N/A	R___	0	0	1
3729	$DV	FSV_B_	Ref is zero	N/A	R___	0	0	1
3730	$DV	FSV_B_	Spd is zero dly	N/A	R___	0	0	1
3731	$DV	FSV_B_	Ref is zero dly	N/A	R___	0	0	1
3732	$PIN	FSV_B_	Spd 0 ref src	N/A	RWS_	3200	LST_020	
3900	$DV	FSV_B_	Exp ana inp en	N/A	RWS_	0	0	1
3901	$DV	FSV_B_	Exp ana out en	N/A	RWS_	0	0	1
3902	$DV	FSV_B_	Exp dig inp en	N/A	RWS_	0	0	1
3903	$DV	FSV_B_	Exp dig out en	N/A	RWS_	0	0	1
4002	$DV	FSV_B_	Command select	N/A	RWS_	4	0	4
4004	$DP	___A_T	En/Disable mode	N/A	R___	0	0	1
4004	$DP	FSV_B_	En/Disable mode	N/A	RWS_	1	0	1
4006	$PP	FSV_B_	Spd 0 dis dly	ms	RWS_	1000.00F	16.00F	4000.00F
4011	$DP	FSV_B_	DI 1 inversion	N/A	RWS_	0	0	1
4012	$DP	FSV_B_	DI 2 inversion	N/A	RWS_	0	0	1
4013	$DP	FSV_B_	DI 3 inversion	N/A	RWS_	0	0	1
4014	$DP	FSV_B_	DI 4 inversion	N/A	RWS_	0	0	1
4015	$DP	FSV_B_	DI 5 inversion	N/A	RWS_	0	0	1
4016	$DP	FSV_B_	DI 6 inversion	N/A	RWS_	0	0	1
4017	$DP	FSV_B_	DI 7 inversion	N/A	RWS_	0	0	1
4020	$DV	FSVABT	DI 0 Enable mon	N/A	R___	0	0	1
4021	$DV	FSV_B_	DI 1 monitor	N/A	R___	0	0	1
4022	$DV	FSV_B_	DI 2 monitor	N/A	R___	0	0	1
4023	$DV	FSV_B_	DI 3 monitor	N/A	R___	0	0	1
4024	$DV	FSV_B_	DI 4 monitor	N/A	R___	0	0	1

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
4025	$DV	FSV_B_	DI 5 monitor	N/A	R___	0	0	1
4026	$DV	FSV_B_	DI 6 monitor	N/A	R___	0	0	1
4027	$DV	FSV_B_	DI 7 monitor	N/A	R___	0	0	1
4028	$DP	FSV_B_	DI 7654321E	N/A	R___	0	0	0xffff
4030	$DP	FSV_B_	DI 0X inversion	N/A	RWS_	0	0	1
4031	$DP	FSV_B_	DI 1X inversion	N/A	RWS_	0	0	1
4032	$DP	FSV_B_	DI 2X inversion	N/A	RWS_	0	0	1
4033	$DP	FSV_B_	DI 3X inversion	N/A	RWS_	0	0	1
4034	$DP	FSV_B_	DI 4X inversion	N/A	RWS_	0	0	1
4035	$DP	FSV_B_	DI 5X inversion	N/A	RWS_	0	0	1
4036	$DP	FSV_B_	DI 6X inversion	N/A	RWS_	0	0	1
4037	$DP	FSV_B_	DI 7X inversion	N/A	RWS_	0	0	1
4038	$DP	FSV_B_	DI 8X inversion	N/A	RWS_	0	0	1
4039	$DP	FSV_B_	DI 9X inversion	N/A	RWS_	0	0	1
4040	$DP	FSV_B_	DI 10X inversion	N/A	RWS_	0	0	1
4041	$DP	FSV_B_	DI 11X inversion	N/A	RWS_	0	0	1
4045	$DV	FSV_B_	DI 0X monitor	N/A	R___	0	0	1
4046	$DV	FSV_B_	DI 1X monitor	N/A	R___	0	0	1
4047	$DV	FSV_B_	DI 2X monitor	N/A	R___	0	0	1
4048	$DV	FSV_B_	DI 3X monitor	N/A	R___	0	0	1
4049	$DV	FSV_B_	DI 4X monitor	N/A	R___	0	0	1
4050	$DV	FSV_B_	DI 5X monitor	N/A	R___	0	0	1
4051	$DV	FSV_B_	DI 6X monitor	N/A	R___	0	0	1
4052	$DV	FSV_B_	DI 7X monitor	N/A	R___	0	0	1
4053	$DV	FSV_B_	DI 8X monitor	N/A	R___	0	0	1
4054	$DV	FSV_B_	DI 9X monitor	N/A	R___	0	0	1
4055	$DV	FSV_B_	DI 10X monitor	N/A	R___	0	0	1
4056	$DV	FSV_B_	DI 11X monitor	N/A	R___	0	0	1
4057	$DP	FSV_B_	DIX BA9876543210	N/A	R___	0	0	0xffff
4060	$DP	FSV_B_	DO 0 inversion	N/A	RWS_	0	0	1
4061	$DP	FSV_B_	DO 1 inversion	N/A	RWS_	0	0	1
4062	$DP	FSV_B_	DO 2 inversion	N/A	RWS_	0	0	1
4063	$DP	FSV_B_	DO 3 inversion	N/A	RWS_	0	0	1
4064	$DP	FSV_B_	DO 3210	N/A	R___	0	0	0xffff
4065	$PIN	____B_	DO 0 src	N/A	RWS_	9097	LST_001_B	
4065	$PIN	F_____	DO 0 src	N/A	RWS_	9097	LST_001_F	
4065	$PIN	_S____	DO 0 src	N/A	RWS_	9097	LST_001_S	
4065	$PIN	__V___	DO 0 src	N/A	RWS_	9097	LST_001_V	
4065	$PIN	F_____	DO 0 src	N/A	RWS_	9097	LST_001_F	
4066	$PIN	_S____	DO 1 src	N/A	RWS_	3730	LST_001_S	
4066	$PIN	F_____	DO 1 src	N/A	RWS_	3730	LST_001_F	
4066	$PIN	____B_	DO 1 src	N/A	RWS_	3730	LST_001_B	
4066	$PIN	__V___	DO 1 src	N/A	RWS_	3730	LST_001_V	
4067	$PIN	F_____	DO 2 src	N/A	RWS_	4000	LST_001_F	
4067	$PIN	_S____	DO 2 src	N/A	RWS_	4000	LST_001_S	
4067	$PIN	__V___	DO 2 src	N/A	RWS_	4000	LST_001_V	
4067	$PIN	____B_	DO 2 src	N/A	RWS_	4000	LST_001_B	
4068	$PIN	F_____	DO 3 src	N/A	RWS_	4000	LST_001_F	
4068	$PIN	____B_	DO 3 src	N/A	RWS_	4000	LST_001_B	
4068	$PIN	_S____	DO 3 src	N/A	RWS_	4000	LST_001_S	
4068	$PIN	__V___	DO 3 src	N/A	RWS_	4000	LST_001_V	
4070	$DP	FSV_B_	DO 0X inversion	N/A	RWS_	0	0	1
4071	$DP	FSV_B_	DO 1X inversion	N/A	RWS_	0	0	1
4072	$DP	FSV_B_	DO 2X inversion	N/A	RWS_	0	0	1
4073	$DP	FSV_B_	DO 3X inversion	N/A	RWS_	0	0	1
4074	$DP	FSV_B_	DO 4X inversion	N/A	RWS_	0	0	1
4075	$DP	FSV_B_	DO 5X inversion	N/A	RWS_	0	0	1
4076	$DP	FSV_B_	DO 6X inversion	N/A	RWS_	0	0	1
4077	$DP	FSV_B_	DO 7X inversion	N/A	RWS_	0	0	1
4078	$DP	FSV_B_	DOX 76543210	N/A	R___	0	0	0xffff

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
4080	$PIN	____B_	DO 0X src	N/A	RWS_	4000	LST_001_B	
4080	$PIN	__V___	DO 0X src	N/A	RWS_	4000	LST_001_V	
4080	$PIN	_S____	DO 0X src	N/A	RWS_	4000	LST_001_S	
4080	$PIN	F_____	DO 0X src	N/A	RWS_	4000	LST_001_F	
4081	$PIN	_S____	DO 1X src	N/A	RWS_	4000	LST_001_S	
4081	$PIN	F_____	DO 1X src	N/A	RWS_	4000	LST_001_F	
4081	$PIN	____B_	DO 1X src	N/A	RWS_	4000	LST_001_B	
4081	$PIN	__V___	DO 1X src	N/A	RWS_	4000	LST_001_V	
4082	$PIN	__V___	DO 2X src	N/A	RWS_	4000	LST_001_V	
4082	$PIN	____B_	DO 2X src	N/A	RWS_	4000	LST_001_B	
4082	$PIN	_S____	DO 2X src	N/A	RWS_	4000	LST_001_S	
4082	$PIN	F_____	DO 2X src	N/A	RWS_	4000	LST_001_F	
4083	$PIN	_S____	DO 3X src	N/A	RWS_	4000	LST_001_S	
4083	$PIN	__V___	DO 3X src	N/A	RWS_	4000	LST_001_V	
4083	$PIN	____B_	DO 3X src	N/A	RWS_	4000	LST_001_B	
4083	$PIN	F_____	DO 3X src	N/A	RWS_	4000	LST_001_F	
4084	$PIN	F_____	DO 4X src	N/A	RWS_	4000	LST_001_F	
4084	$PIN	_S____	DO 4X src	N/A	RWS_	4000	LST_001_S	
4084	$PIN	__V___	DO 4X src	N/A	RWS_	4000	LST_001_V	
4084	$PIN	____B_	DO 4X src	N/A	RWS_	4000	LST_001_B	
4085	$PIN	F_____	DO 5X src	N/A	RWS_	4000	LST_001_F	
4085	$PIN	_S____	DO 5X src	N/A	RWS_	4000	LST_001_S	
4085	$PIN	__V___	DO 5X src	N/A	RWS_	4000	LST_001_V	
4085	$PIN	____B_	DO 5X src	N/A	RWS_	4000	LST_001_B	
4086	$PIN	____B_	DO 6X src	N/A	RWS_	4000	LST_001_B	
4086	$PIN	__V___	DO 6X src	N/A	RWS_	4000	LST_001_V	
4086	$PIN	F_____	DO 6X src	N/A	RWS_	4000	LST_001_F	
4086	$PIN	_S____	DO 6X src	N/A	RWS_	4000	LST_001_S	
4087	$PIN	F_____	DO 7X src	N/A	RWS_	4000	LST_001_F	
4087	$PIN	_S____	DO 7X src	N/A	RWS_	4000	LST_001_S	
4087	$PIN	__V___	DO 7X src	N/A	RWS_	4000	LST_001_V	
4087	$PIN	____B_	DO 7X src	N/A	RWS_	4000	LST_001_B	
4090	$PIN	F_____	An out 1X src	N/A	RWS_	4000	LST_002_F	
4090	$PIN	_S____	An out 1X src	N/A	RWS_	4000	LST_002_S	
4090	$PIN	____B_	An out 1X src	N/A	RWS_	4000	LST_002_B	
4090	$PIN	__V___	An out 1X src	N/A	RWS_	4000	LST_002_V	
4091	$PIN	____B_	An out 2X src	N/A	RWS_	4000	LST_002_B	
4091	$PIN	__V___	An out 2X src	N/A	RWS_	4000	LST_002_V	
4091	$PIN	_S____	An out 2X src	N/A	RWS_	4000	LST_002_S	
4091	$PIN	F_____	An out 2X src	N/A	RWS_	4000	LST_002_F	
4092	$PIN	____B_	An out 3X src	N/A	RWS_	4000	LST_002_B	
4092	$PIN	__V___	An out 3X src	N/A	RWS_	4000	LST_002_V	
4092	$PIN	_S____	An out 3X src	N/A	RWS_	4000	LST_002_S	
4092	$PIN	F_____	An out 3X src	N/A	RWS_	4000	LST_002_F	
4093	$PIN	__V___	An out 4X src	N/A	RWS_	4000	LST_002_V	
4093	$PIN	_S____	An out 4X src	N/A	RWS_	4000	LST_002_S	
4093	$PIN	F_____	An out 4X src	N/A	RWS_	4000	LST_002_F	
4093	$PIN	____B_	An out 4X src	N/A	RWS_	4000	LST_002_B	
4100	$PIN	F_____	Drv DGFC-S W0src	N/A	RWS_	4105	LST_029_F	
4100	$PIN	____B_	Drv DGFC-S W0src	N/A	RWS_	4105	LST_029_B	
4100	$PIN	_S____	Drv DGFC-S W0src	N/A	RWS_	4105	LST_029_S	
4100	$PIN	__V___	Drv DGFC-S W0src	N/A	RWS_	4105	LST_029_V	
4101	$PIN	F_____	Drv DGFC-S W1src	N/A	RWS_	4106	LST_029_F	
4101	$PIN	_S____	Drv DGFC-S W1src	N/A	RWS_	4106	LST_029_S	
4101	$PIN	__V___	Drv DGFC-S W1src	N/A	RWS_	4106	LST_029_V	
4101	$PIN	____B_	Drv DGFC-S W1src	N/A	RWS_	4106	LST_029_B	
4102	$PIN	F_____	Drv DGFC-S W2src	N/A	RWS_	4107	LST_029_F	
4102	$PIN	_S____	Drv DGFC-S W2src	N/A	RWS_	4107	LST_029_S	
4102	$PIN	__V___	Drv DGFC-S W2src	N/A	RWS_	4107	LST_029_V	
4102	$PIN	____B_	Drv DGFC-S W2src	N/A	RWS_	4107	LST_029_B	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
4103	$PIN	__V___	Drv DGFC-S W3src	N/A	RWS_	4108	LST_029_V	
4103	$PIN	____B_	Drv DGFC-S W3src	N/A	RWS_	4108	LST_029_B	
4103	$PIN	F_____	Drv DGFC-S W3src	N/A	RWS_	4108	LST_029_F	
4103	$PIN	_S____	Drv DGFC-S W3src	N/A	RWS_	4108	LST_029_S	
4104	$PIN	F_____	Drv DGFC-S W4src	N/A	RWS_	4109	LST_029_F	
4104	$PIN	__V___	Drv DGFC-S W4src	N/A	RWS_	4109	LST_029_V	
4104	$PIN	____B_	Drv DGFC-S W4src	N/A	RWS_	4109	LST_029_B	
4104	$PIN	_S____	Drv DGFC-S W4src	N/A	RWS_	4109	LST_029_S	
4105	$PV	FSV_B_	Int DrvDGFC-S W0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4106	$PV	FSV_B_	Int DrvDGFC-S W1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4107	$PV	FSV_B_	Int DrvDGFC-S W2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4108	$PV	FSV_B_	Int DrvDGFC-S W3	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4109	$PV	FSV_B_	Int DrvDGFC-S W4	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4110	$PP	FSV_B_	Drv DGFC-S W0mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4111	$PP	FSV_B_	Drv DGFC-S W1mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4112	$PP	FSV_B_	Drv DGFC-S W2mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4113	$PP	FSV_B_	Drv DGFC-S W3mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4114	$PP	FSV_B_	Drv DGFC-S W4mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4120	$PV	FSV_B_	DGFC-S Drv W0mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4121	$PV	FSV_B_	DGFC-S Drv W1mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4122	$PV	FSV_B_	DGFC-S Drv W2mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4123	$PV	FSV_B_	DGFC-S Drv W3mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4124	$PV	FSV_B_	DGFC-S Drv W4mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4130	$PIN	____B_	Drv DGFC-A W0src	N/A	RWS_	4140	LST_030_B	
4130	$PIN	F_____	Drv DGFC-A W0src	N/A	RWS_	4140	LST_030_F	
4130	$PIN	_S____	Drv DGFC-A W0src	N/A	RWS_	4140	LST_030_S	
4130	$PIN	__V___	Drv DGFC-A W0src	N/A	RWS_	4140	LST_030_V	
4131	$PIN	F_____	Drv DGFC-A W1src	N/A	RWS_	4141	LST_030_F	
4131	$PIN	_S____	Drv DGFC-A W1src	N/A	RWS_	4141	LST_030_S	
4131	$PIN	__V___	Drv DGFC-A W1src	N/A	RWS_	4141	LST_030_V	
4131	$PIN	____B_	Drv DGFC-A W1src	N/A	RWS_	4141	LST_030_B	
4132	$PIN	____B_	Drv DGFC-A W2src	N/A	RWS_	4142	LST_030_B	
4132	$PIN	__V___	Drv DGFC-A W2src	N/A	RWS_	4142	LST_030_V	
4132	$PIN	_S____	Drv DGFC-A W2src	N/A	RWS_	4142	LST_030_S	
4132	$PIN	F_____	Drv DGFC-A W2src	N/A	RWS_	4142	LST_030_F	
4133	$PIN	____B_	Drv DGFC-A W3src	N/A	RWS_	4143	LST_030_B	
4133	$PIN	__V___	Drv DGFC-A W3src	N/A	RWS_	4143	LST_030_V	
4133	$PIN	F_____	Drv DGFC-A W3src	N/A	RWS_	4143	LST_030_F	
4133	$PIN	_S____	Drv DGFC-A W3src	N/A	RWS_	4143	LST_030_S	
4134	$PIN	_S____	Drv DGFC-A W4src	N/A	RWS_	4144	LST_030_S	
4134	$PIN	__V___	Drv DGFC-A W4src	N/A	RWS_	4144	LST_030_V	
4134	$PIN	F_____	Drv DGFC-A W4src	N/A	RWS_	4144	LST_030_F	
4134	$PIN	____B_	Drv DGFC-A W4src	N/A	RWS_	4144	LST_030_B	
4135	$PIN	F_____	Drv DGFC-A W5src	N/A	RWS_	4145	LST_030_F	
4135	$PIN	____B_	Drv DGFC-A W5src	N/A	RWS_	4145	LST_030_B	
4135	$PIN	__V___	Drv DGFC-A W5src	N/A	RWS_	4145	LST_030_V	
4135	$PIN	_S____	Drv DGFC-A W5src	N/A	RWS_	4145	LST_030_S	
4136	$PIN	____B_	Drv DGFC-A W6src	N/A	RWS_	4146	LST_030_B	
4136	$PIN	__V___	Drv DGFC-A W6src	N/A	RWS_	4146	LST_030_V	
4136	$PIN	_S____	Drv DGFC-A W6src	N/A	RWS_	4146	LST_030_S	
4136	$PIN	F_____	Drv DGFC-A W6src	N/A	RWS_	4146	LST_030_F	
4137	$PIN	_S____	Drv DGFC-A W7src	N/A	RWS_	4147	LST_030_S	
4137	$PIN	F_____	Drv DGFC-A W7src	N/A	RWS_	4147	LST_030_F	
4137	$PIN	____B_	Drv DGFC-A W7src	N/A	RWS_	4147	LST_030_B	
4137	$PIN	__V___	Drv DGFC-A W7src	N/A	RWS_	4147	LST_030_V	
4138	$PIN	_S____	Drv DGFC-A W8src	N/A	RWS_	4148	LST_030_S	
4138	$PIN	____B_	Drv DGFC-A W8src	N/A	RWS_	4148	LST_030_B	
4138	$PIN	__V___	Drv DGFC-A W8src	N/A	RWS_	4148	LST_030_V	
4138	$PIN	F_____	Drv DGFC-A W8src	N/A	RWS_	4148	LST_030_F	
4139	$PIN	_S____	Drv DGFC-A W9src	N/A	RWS_	4149	LST_030_S	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
4139	$PIN	F_____	Drv DGFC-A W9src	N/A	RWS_	4149	LST_030_F	
4139	$PIN	__V___	Drv DGFC-A W9src	N/A	RWS_	4149	LST_030_V	
4139	$PIN	____B_	Drv DGFC-A W9src	N/A	RWS_	4149	LST_030_B	
4140	$PV	FSV_B_	Int DrvDGFC-A W0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4141	$PV	FSV_B_	Int DrvDGFC-A W1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4142	$PV	FSV_B_	Int DrvDGFC-A W2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4143	$PV	FSV_B_	Int DrvDGFC-A W3	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4144	$PV	FSV_B_	Int DrvDGFC-A W4	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4145	$PV	FSV_B_	Int DrvDGFC-A W5	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4146	$PV	FSV_B_	Int DrvDGFC-A W6	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4147	$PV	FSV_B_	Int DrvDGFC-A W7	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4148	$PV	FSV_B_	Int DrvDGFC-A W8	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4149	$PV	FSV_B_	Int DrvDGFC-A W9	NULL	RWS_	0.00F	INT_MIN	INT_MAX
4150	$PP	FSV_B_	Drv DGFC-A W0mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4151	$PP	FSV_B_	Drv DGFC-A W1mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4152	$PP	FSV_B_	Drv DGFC-A W2mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4153	$PP	FSV_B_	Drv DGFC-A W3mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4154	$PP	FSV_B_	Drv DGFC-A W4mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4155	$PP	FSV_B_	Drv DGFC-A W5mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4156	$PP	FSV_B_	Drv DGFC-A W6mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4157	$PP	FSV_B_	Drv DGFC-A W7mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4158	$PP	FSV_B_	Drv DGFC-A W8mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4159	$PP	FSV_B_	Drv DGFC-A W9mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4160	$PV	FSV_B_	DGFC-A Drv W0mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4161	$PV	FSV_B_	DGFC-A Drv W1mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4162	$PV	FSV_B_	DGFC-A Drv W2mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4163	$PV	FSV_B_	DGFC-A Drv W3mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4164	$PV	FSV_B_	DGFC-A Drv W4mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4165	$PV	FSV_B_	DGFC-A Drv W5mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4166	$PV	FSV_B_	DGFC-A Drv W6mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4167	$PV	FSV_B_	DGFC-A Drv W7mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4168	$PV	FSV_B_	DGFC-A Drv W8mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4169	$PV	FSV_B_	DGFC-A Drv W9mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4200	$DP	FSVABT	CCF restart	N/A	RWS_	0	0	1
4201	$PP	FSVABT	CCF restart time	ms	RWS_	1000.00F	0.00F	30000.0F
4202	$DP	FSVABT	Hw fault mon	N/A	R___	0	0	0
4216	$PP	FSV_B_	Drv ISBus W0mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4217	$PP	FSV_B_	Drv ISBus W1mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4218	$PP	FSV_B_	Drv ISBus W2mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4219	$PP	FSV_B_	Drv ISBus W3mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4220	$PP	FSV_B_	Drv ISBus W4mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4221	$PP	FSV_B_	Drv ISBus W5mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4222	$PP	FSV_B_	Drv ISBus W6mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4223	$PP	FSV_B_	Drv ISBus W7mon	NULL	R___	0.00F	INT_MIN	INT_MAX
4230	$PIN	__V___	Drv ISBus W0src	N/A	RWS_	9320	LST_028_V	
4230	$PIN	_S____	Drv ISBus W0src	N/A	RWS_	9320	LST_028_S	
4230	$PIN	F_____	Drv ISBus W0src	N/A	RWS_	9320	LST_028_F	
4230	$PIN	____B_	Drv ISBus W0src	N/A	RWS_	9320	LST_028_B	
4231	$PIN	__V___	Drv ISBus W1src	N/A	RWS_	9321	LST_028_V	
4231	$PIN	____B_	Drv ISBus W1src	N/A	RWS_	9321	LST_028_B	
4231	$PIN	_S____	Drv ISBus W1src	N/A	RWS_	9321	LST_028_S	
4231	$PIN	F_____	Drv ISBus W1src	N/A	RWS_	9321	LST_028_F	
4232	$PIN	____B_	Drv ISBus W2src	N/A	RWS_	9322	LST_028_B	
4232	$PIN	F_____	Drv ISBus W2src	N/A	RWS_	9322	LST_028_F	
4232	$PIN	_S____	Drv ISBus W2src	N/A	RWS_	9322	LST_028_S	
4232	$PIN	__V___	Drv ISBus W2src	N/A	RWS_	9322	LST_028_V	
4233	$PIN	____B_	Drv ISBus W3src	N/A	RWS_	9323	LST_028_B	
4233	$PIN	__V___	Drv ISBus W3src	N/A	RWS_	9323	LST_028_V	
4233	$PIN	_S____	Drv ISBus W3src	N/A	RWS_	9323	LST_028_S	
4233	$PIN	F_____	Drv ISBus W3src	N/A	RWS_	9323	LST_028_F	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
4234	$PIN	F_____	Drv ISBus W4src	N/A	RWS_	9324	LST_028_F	
4234	$PIN	_S____	Drv ISBus W4src	N/A	RWS_	9324	LST_028_S	
4234	$PIN	__V___	Drv ISBus W4src	N/A	RWS_	9324	LST_028_V	
4234	$PIN	____B_	Drv ISBus W4src	N/A	RWS_	9324	LST_028_B	
4235	$PIN	_S____	Drv ISBus W5src	N/A	RWS_	9325	LST_028_S	
4235	$PIN	__V___	Drv ISBus W5src	N/A	RWS_	9325	LST_028_V	
4235	$PIN	____B_	Drv ISBus W5src	N/A	RWS_	9325	LST_028_B	
4235	$PIN	F_____	Drv ISBus W5src	N/A	RWS_	9325	LST_028_F	
4236	$PIN	_S____	Drv ISBus W6src	N/A	RWS_	9326	LST_028_S	
4236	$PIN	____B_	Drv ISBus W6src	N/A	RWS_	9326	LST_028_B	
4236	$PIN	__V___	Drv ISBus W6src	N/A	RWS_	9326	LST_028_V	
4236	$PIN	F_____	Drv ISBus W6src	N/A	RWS_	9326	LST_028_F	
4237	$PIN	F_____	Drv ISBus W7src	N/A	RWS_	9327	LST_028_F	
4237	$PIN	_S____	Drv ISBus W7src	N/A	RWS_	9327	LST_028_S	
4237	$PIN	__V___	Drv ISBus W7src	N/A	RWS_	9327	LST_028_V	
4237	$PIN	____B_	Drv ISBus W7src	N/A	RWS_	9327	LST_028_B	
5000	$DP	FSV_B_	An inp 1 type	N/A	RWS_	0	0	2
5001	$PP	FSV_B_	An inp 1 offset	cnt	RWS_	0.00F	-16384.F	16383.F
5002	$PV	FSV_B_	AI 1 alt value	cnt	RWS_	0.00F	INT_MIN	INT_MAX
5003	$PP	FSV_B_	An inp 1 thr	cnt	RWS_	3277.00F	-16384.F	16383.F
5004	$PP	FSV_B_	An inp 1 scale	NULL	RWS_	1.00F	-16.00F	16.00F
5005	$PP	FSV_B_	An inp 1 gain	NULL	RWS_	1.00F	-16.00F	16.00F
5006	$PP	FSV_B_	An inp 1 filter	s	RWS_	0.0064F	CALC	CALC
5007	$PP	FSV_B_	An inp 1 lo lim	cnt	RWS_	-16384.00F	INT_MIN	INT_MAX
5008	$PP	FSV_B_	An inp 1 hi lim	cnt	RWS_	16383.00F	INT_MIN	INT_MAX
5009	$PV	FSV_B_	An inp 1 output	cnt	R___	0.00F	INT_MIN	INT_MAX
5010	$DV	FSV_B_	An inp 1 < thr	N/A	R___	0	0	1
5011	$PIN	FSV_B_	AI 1 sgn src	N/A	RWS_	4000	LST_003	
5012	$PIN	FSV_B_	AI 1 alt sel src	N/A	RWS_	4000	LST_003	
5020	$DP	FSV_B_	An inp 2 type	N/A	RWS_	0	0	2
5021	$PP	FSV_B_	An inp 2 offset	cnt	RWS_	0.00F	-16384.F	16383.F
5022	$PV	FSV_B_	AI 2 alt value	cnt	RWS_	0.00F	INT_MIN	INT_MAX
5023	$PP	FSV_B_	An inp 2 thr	cnt	RWS_	3277.00F	-16384.F	16383.F
5024	$PP	FSV_B_	An inp 2 scale	NULL	RWS_	1.00F	-16.00F	16.00F
5025	$PP	FSV_B_	An inp 2 gain	NULL	RWS_	1.00F	-16.00F	16.00F
5026	$PP	FSV_B_	An inp 2 filter	s	RWS_	0.0064F	CALC	CALC
5027	$PP	FSV_B_	An inp 2 lo lim	cnt	RWS_	-16384.00F	INT_MIN	INT_MAX
5028	$PP	FSV_B_	An inp 2 hi lim	cnt	RWS_	16383.00F	INT_MIN	INT_MAX
5029	$PV	FSV_B_	An inp 2 output	cnt	R___	0.00F	INT_MIN	INT_MAX
5030	$DV	FSV_B_	An inp 2 < thr	N/A	R___	0	0	1
5031	$PIN	FSV_B_	AI 2 sgn src	N/A	RWS_	4000	LST_003	
5032	$PIN	FSV_B_	AI 2 alt sel src	N/A	RWS_	4000	LST_003	
5040	$DP	FSV_B_	An inp 3 type	N/A	RWS_	0	0	2
5041	$PP	FSV_B_	An inp 3 offset	cnt	RWS_	0.00F	-16384.F	16383.F
5042	$PV	FSV_B_	AI 3 alt value	cnt	RWS_	0.00F	INT_MIN	INT_MAX
5043	$PP	FSV_B_	An inp 3 thr	cnt	RWS_	3277.00F	-16384.F	16383.F
5044	$PP	FSV_B_	An inp 3 scale	NULL	RWS_	1.00F	-16.00F	16.00F
5045	$PP	FSV_B_	An inp 3 gain	NULL	RWS_	1.00F	-16.00F	16.00F
5046	$PP	FSV_B_	An inp 3 filter	s	RWS_	0.0064F	CALC	CALC
5047	$PP	FSV_B_	An inp 3 lo lim	cnt	RWS_	-16384.00F	INT_MIN	INT_MAX
5048	$PP	FSV_B_	An inp 3 hi lim	cnt	RWS_	16383.00F	INT_MIN	INT_MAX
5049	$PV	FSV_B_	An inp 3 output	cnt	R___	0.00F	INT_MIN	INT_MAX
5050	$DV	FSV_B_	An inp 3 < thr	N/A	R___	0	0	1
5051	$PIN	FSV_B_	AI 3 sgn src	N/A	RWS_	4000	LST_003	
5052	$PIN	FSV_B_	AI 3 alt sel src	N/A	RWS_	4000	LST_003	
5060	$DP	FSV_B_	An inp 1X type	N/A	RWS_	0	0	2
5061	$PP	FSV_B_	An inp 1X offset	cnt	RWS_	0.00F	-16384.F	16383.F
5062	$PP	FSV_B_	An inp 1X thr	cnt	RWS_	3277.00F	-16384.F	16383.F
5063	$PP	FSV_B_	An inp 1X scale	NULL	RWS_	1.00F	-16.00F	16.00F
5064	$PP	FSV_B_	An inp 1X gain	NULL	RWS_	1.00F	-16.00F	16.00F

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
5065	$PP	FSV_B_	An inp 1X lo lim	cnt	RWS_	-16384.00F	INT_MIN	INT_MAX
5066	$PP	FSV_B_	An inp 1X hi lim	cnt	RWS_	16383.00F	INT_MIN	INT_MAX
5067	$PV	FSV_B_	An inp 1X output	cnt	R___	0.00F	INT_MIN	INT_MAX
5068	$DV	FSV_B_	An inp 1X < thr	N/A	R___	0	0	1
5069	$PIN	FSV_B_	AI 1X sgn src	N/A	RWS_	4000	LST_003	
5080	$DP	FSV_B_	An inp 2X type	N/A	RWS_	0	0	2
5081	$PP	FSV_B_	An inp 2X offset	cnt	RWS_	0.00F	-16384.F	16383.F
5082	$PP	FSV_B_	An inp 2X thr	cnt	RWS_	3277.00F	-16384.F	16383.F
5083	$PP	FSV_B_	An inp 2X scale	NULL	RWS_	1.00F	-16.00F	16.00F
5084	$PP	FSV_B_	An inp 2X gain	NULL	RWS_	1.00F	-16.00F	16.00F
5085	$PP	FSV_B_	An inp 2X lo lim	cnt	RWS_	-16384.00F	INT_MIN	INT_MAX
5086	$PP	FSV_B_	An inp 2X hi lim	cnt	RWS_	16383.00F	INT_MIN	INT_MAX
5087	$PV	FSV_B_	An inp 2X output	cnt	R___	0.00F	INT_MIN	INT_MAX
5088	$DV	FSV_B_	An inp 2X < thr	N/A	R___	0	0	1
5089	$PIN	FSV_B_	AI 2X sgn src	N/A	RWS_	4000	LST_003	
6010	$PP	FSVABT	An out 1 hi lim	cnt	RWS_	16383.00F	0.00F	INT_MAX
6011	$PP	FSVABT	An out 1 lo lim	cnt	RWS_	-16384.00F	INT_MIN	0.00F
6012	$PP	FSVABT	An out 1 scale	NULL	RWS_	1.00F	-10.00F	10.00F
6013	$PP	FSVABT	An out 1 mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6015	$PP	FSVABT	An out 2 hi lim	cnt	RWS_	16383.00F	0.00F	INT_MAX
6016	$PP	FSVABT	An out 2 lo lim	cnt	RWS_	-16384.00F	INT_MIN	0.00F
6017	$PP	FSVABT	An out 2 scale	NULL	RWS_	1.00F	-10.00F	10.00F
6018	$PP	FSVABT	An out 2 mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6020	$PP	FSV_B_	An out 1X hi lim	cnt	RWS_	16383.00F	0.00F	INT_MAX
6021	$PP	FSV_B_	An out 1X lo lim	cnt	RWS_	-16384.00F	INT_MIN	0.00F
6022	$PP	FSV_B_	An out 1X scale	NULL	RWS_	1.00F	-10.00F	10.00F
6023	$PP	FSV_B_	An out 1X mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6025	$PP	FSV_B_	An out 2X hi lim	cnt	RWS_	16383.00F	0.00F	INT_MAX
6026	$PP	FSV_B_	An out 2X lo lim	cnt	RWS_	-16384.00F	INT_MIN	0.00F
6027	$PP	FSV_B_	An out 2X scale	NULL	RWS_	1.00F	-10.00F	10.00F
6028	$PP	FSV_B_	An out 2X mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6030	$PP	FSV_B_	An out 3X hi lim	cnt	RWS_	16363.00F	0.00F	INT_MAX
6031	$PP	FSV_B_	An out 3X lo lim	cnt	RWS_	0.00F	INT_MIN	0.00F
6032	$PP	FSV_B_	An out 3X scale	NULL	RWS_	1.00F	-10.00F	10.00F
6033	$PP	FSV_B_	An out 3X mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6034	$DP	FSV_B_	An out 3x type	N/A	RWS_	0	0	1
6035	$PP	FSV_B_	An out 4X hi lim	cnt	RWS_	16383.00F	0.00F	INT_MAX
6036	$PP	FSV_B_	An out 4X lo lim	cnt	RWS_	0.00F	INT_MIN	0.00F
6037	$PP	FSV_B_	An out 4X scale	NULL	RWS_	1.00F	-10.00F	10.00F
6038	$PP	FSV_B_	An out 4X mon	cnt	R___	0.00F	INT_MIN	INT_MAX
6039	$DP	FSV_B_	An out 4x type	N/A	RWS_	0	0	1
6041	$PV	FSV_B_	Cmp 1 inp 0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6042	$PV	FSV_B_	Cmp 1 inp 1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6043	$PV	FSV_B_	Cmp 1 inp 2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6044	$DP	FSV_B_	Cmp 1 function	N/A	RWS_	0	0	10
6045	$PP	FSV_B_	Cmp 1 window	cnt	RWS_	0.00F	0.00F	INT_MAX
6046	$PP	FSV_B_	Cmp 1 delay	s	RWS_	0.00F	0.00F	30.00F
6047	$DP	FSV_B_	Cmp 1 inversion	N/A	RWS_	0	0	1
6048	$DV	FSV_B_	Compare 1 output	N/A	R___	0	0	1
6049	$PIN	_S____	Cmp 1 inp 0 src	N/A	RWS_	6041	LST_005_S	
6049	$PIN	__V___	Cmp 1 inp 0 src	N/A	RWS_	6041	LST_005_V	
6049	$PIN	____B_	Cmp 1 inp 0 src	N/A	RWS_	6041	LST_005_B	
6049	$PIN	F_____	Cmp 1 inp 0 src	N/A	RWS_	6041	LST_005_F	
6050	$PIN	__V___	Cmp 1 inp 1 src	N/A	RWS_	6042	LST_005_V	
6050	$PIN	_S____	Cmp 1 inp 1 src	N/A	RWS_	6042	LST_005_S	
6050	$PIN	F_____	Cmp 1 inp 1 src	N/A	RWS_	6042	LST_005_F	
6050	$PIN	____B_	Cmp 1 inp 1 src	N/A	RWS_	6042	LST_005_B	
6051	$PIN	__V___	Cmp 1 inp 2 src	N/A	RWS_	6043	LST_005_V	
6051	$PIN	F_____	Cmp 1 inp 2 src	N/A	RWS_	6043	LST_005_F	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
6051	$PIN	____B_	Cmp 1 inp 2 src	N/A	RWS_	6043	LST_005_B	
6051	$PIN	_S____	Cmp 1 inp 2 src	N/A	RWS_	6043	LST_005_S	
6056	$PV	FSV_B_	Cmp 2 inp 0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6057	$PV	FSV_B_	Cmp 2 inp 1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6058	$PV	FSV_B_	Cmp 2 inp 2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
6059	$DP	FSV_B_	Cmp 2 function	N/A	RWS_	0	0	10
6060	$PP	FSV_B_	Cmp 2 window	cnt	RWS_	0.00F	0.00F	INT_MAX
6061	$PP	FSV_B_	Cmp 2 delay	s	RWS_	0.00F	0.00F	30.00F
6062	$DP	FSV_B_	Cmp 2 inversion	N/A	RWS_	0	0	1
6063	$DV	FSV_B_	Compare 2 output	N/A	R___	0	0	1
6064	$PIN	F_____	Cmp 2 inp 0 src	N/A	RWS_	6056	LST_006_F	
6064	$PIN	_S____	Cmp 2 inp 0 src	N/A	RWS_	6056	LST_006_S	
6064	$PIN	____B_	Cmp 2 inp 0 src	N/A	RWS_	6056	LST_006_B	
6064	$PIN	__V___	Cmp 2 inp 0 src	N/A	RWS_	6056	LST_006_V	
6065	$PIN	F_____	Cmp 2 inp 1 src	N/A	RWS_	6057	LST_006_F	
6065	$PIN	____B_	Cmp 2 inp 1 src	N/A	RWS_	6057	LST_006_B	
6065	$PIN	__V___	Cmp 2 inp 1 src	N/A	RWS_	6057	LST_006_V	
6065	$PIN	_S____	Cmp 2 inp 1 src	N/A	RWS_	6057	LST_006_S	
6066	$PIN	F_____	Cmp 2 inp 2 src	N/A	RWS_	6058	LST_006_F	
6066	$PIN	__V___	Cmp 2 inp 2 src	N/A	RWS_	6058	LST_006_V	
6066	$PIN	____B_	Cmp 2 inp 2 src	N/A	RWS_	6058	LST_006_B	
6066	$PIN	_S____	Cmp 2 inp 2 src	N/A	RWS_	6058	LST_006_S	
7029	$PIN	_S____	Ramp ref 3 src	N/A	RWS_	5009	LST_007_S	
7030	$PV	FSV_B_	Int ramp ref 1	rpm	RWS_	0.00F	CALC	CALC
7031	$PV	FSV_B_	Int ramp ref 2	rpm	RWS_	0.00F	CALC	CALC
7032	$PP	FSV_B_	Ramp ref 1 mon	rpm	R___	0.00F	0.00F	0.00F
7033	$PP	FSV_B_	Ramp ref 2 mon	rpm	R___	0.00F	0.00F	0.00F
7034	$PV	FSV_B_	Ramp setpoint	rpm	R___	0.00F	0.00F	0.00F
7035	$PIN	_S____	Ramp ref 1 src	N/A	RWS_	5009	LST_007_S	
7035	$PIN	F_V_B_	Ramp ref 1 src	N/A	RWS_	5009	LST_007_FVB	
7036	$PIN	F_V_B_	Ramp ref 2 src	N/A	RWS_	7031	LST_008_FVB	
7036	$PIN	_S____	Ramp ref 2 src	N/A	RWS_	7031	LST_008_S	
7037	$PIN	FSV_B_	Ramp ref inv src	N/A	RWS_	4000	LST_003	
7038	$PV	FSV_B_	Int ramp ref 3	rpm	RWS_	0.00F	CALC	CALC
7032	$PP	FSV_B_	Ramp ref 3 mon	rpm	R___	0.00F	0.00F	0.00F
7040	$PV	FSV_B_	Int speed ref 1	rpm	RWS_	0.00F	CALC	CALC
7041	$PV	FSV_B_	Int speed ref 2	rpm	RWS_	0.00F	CALC	CALC
7042	$PV	FSV_B_	Speed top	rpm	RWS_	2000.00F	CALC	CALC
7043	$PV	FSV_B_	Speed bottom	rpm	RWS_	-2000.00F	CALC	CALC
7044	$PV	FSV_B_	Int speed ratio	%	RWS_	100.00F	0.00F	200.00F
7045	$PP	FSV_B_	Speed ref 1 mon	rpm	R___	0.00F	0.00F	0.00F
7046	$PP	FSV_B_	Speed ref 2 mon	rpm	R___	0.00F	0.00F	0.00F
7047	$PV	FSV_B_	Speed setpoint	rpm	R___	0.00F	0.00F	0.00F
7048	$PP	FSV_B_	Speed ratio mon	%	R___	0.00F	0.00F	0.00F
7049	$DV	FSV_B_	Speed lim state	N/A	R___	0	0	1
7050	$PIN	F_V_B_	Speed ref 1 src	N/A	RWS_	7040	LST_009_FVB	
7050	$PIN	_S____	Speed ref 1 src	N/A	RWS_	7040	LST_009_S	
7051	$PIN	F_V_B_	Speed ref 2 src	N/A	RWS_	7041	LST_010_FVB	
7051	$PIN	_S____	Speed ref 2 src	N/A	RWS_	7041	LST_010_S	
7052	$PIN	FSV_B_	Speed ratio src	N/A	RWS_	7044	LST_013	
7053	$PIN	FSV_B_	Speedref inv src	N/A	RWS_	4000	LST_003	
7054	$PIN	FS__B_	Spd I=0 src	N/A	RWS_	4000	LST_003	
7055	$DV	FS__B_	Spd I=0 mon	N/A	R___	0	0	1
7056	$PIN	FS__B_	Spd PI=0 src	N/A	RWS_	4000	LST_003	
7057	$DP	FS__B_	Spd PI=0 mon	N/A	R___	0	0	1
7058	$PIN	F___B_	Spd fbk sel src	N/A	RWS_	1940	LST_022	
7059	$DP	FSV_B_	Spd reg enable	N/A	WS_Z	1	0	1
7060	$PV	FSV_B_	Mlt spd 0	rpm	RWS_	0.00F	CALC	CALC
7061	$PP	FSV_B_	Mlt spd 1	rpm	RWS_	0.00F	CALC	CALC
7062	$PP	FSV_B_	Mlt spd 2	rpm	RWS_	0.00F	CALC	CALC

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
7063	$PP	FSV_B_	Mlt spd 3	rpm	RWS_	0.00F	CALC	CALC
7064	$PP	FSV_B_	Mlt spd 4	rpm	RWS_	0.00F	CALC	CALC
7065	$PP	FSV_B_	Mlt spd 5	rpm	RWS_	0.00F	CALC	CALC
7066	$PP	FSV_B_	Mlt spd 6	rpm	RWS_	0.00F	CALC	CALC
7067	$PP	FSV_B_	Mlt spd 7	rpm	RWS_	0.00F	CALC	CALC
7068	$PP	FSV_B_	Mlt spd 0 mon	rpm	R___	0.00F	0.00F	0.00F
7069	$DP	FSV_B_	Mlt spd sel mon	N/A	R___	0	0	7
7070	$PV	FSV_B_	Mlt spd out mon	rpm	R___	0.00F	0.00F	0.00F
7071	$PIN	_S____	Mlt spd 0 src	N/A	RWS_	7060	LST_011_S	
7071	$PIN	F_V_B_	Mlt spd 0 src	N/A	RWS_	7060	LST_011_FVB	
7072	$PIN	FSV_B_	Mlt spd s 0 src	N/A	RWS_	4000	LST_003	
7073	$PIN	FSV_B_	Mlt spd s 1 src	N/A	RWS_	4000	LST_003	
7074	$PIN	FSV_B_	Mlt spd s 2 src	N/A	RWS_	4000	LST_003	
7080	$PP	FSV_B_	Mpot lower lim	rpm	RWS_	0.00F	CALC	CALC
7081	$PP	FSV_B_	Mpot upper lim	rpm	RWS_	1000.00F	CALC	CALC
7082	$PV	FSV_B_	Mpot acc dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
7083	$PV	FSV_B_	Mpot acc dlt tim	s	RWS_	10.00F	0.50F	10000.0F
7084	$PV	FSV_B_	Mpot dec dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
7085	$PV	FSV_B_	Mpot dec dlt tim	s	RWS_	10.00F	0.50F	10000.0F
7086	$DP	FSV_B_	Mpot init cfg	N/A	RWS_	0	0	3
7087	$DP	FSV_B_	Mpot preset cfg	N/A	RWS_	0	0	11
7089	$DP	FSV_B_	Mpot cmd mon	N/A	R___	0	0	15
7090	$PV	FSV_B_	Mpot output mon	rpm	R__U	0.00F	0.00F	0.00F
7091	$PIN	FSV_B_	Mpot up src	N/A	RWS_	4000	LST_003	
7092	$PIN	FSV_B_	Mpot down src	N/A	RWS_	4000	LST_003	
7093	$PIN	FSV_B_	Mpot invers src	N/A	RWS_	4000	LST_003	
7094	$PIN	FSV_B_	Mpot preset src	N/A	RWS_	4000	LST_003	
7099	$PV	FSV_B_	Speed draw out	rpm	R___	0.00F	0.00F	0.00F
7210	$PIN	F_____	PID inp FF src	N/A	RWS_	7211	LST_031_F	
7210	$PIN	_S____	PID inp FF src	N/A	RWS_	7211	LST_031_S	
7210	$PIN	__V___	PID inp FF src	N/A	RWS_	7211	LST_031_V	
7210	$PIN	____B_	PID inp FF src	N/A	RWS_	7211	LST_031_B	
7211	$PV	FSV_B_	Int PID inp FF	%	RWS_	0.00F	-200.00F	200.00F
7212	$PV	FSV_B_	PID inp FF gain	NULL	RWS_	1.00F	-16.00F	16.00F
7216	$PP	FSV_B_	PID inp FF mon	%	R___	0.00F	-200.00F	200.00F
7217	$PV	FSV_B_	PID FF mon	%	R___	0.00F	-200.00F	200.00F
7220	$PIN	_S____	PID fbk src	N/A	RWS_	7230	LST_032_S	
7220	$PIN	____B_	PID fbk src	N/A	RWS_	7230	LST_032_B	
7220	$PIN	F_____	PID fbk src	N/A	RWS_	7230	LST_032_F	
7220	$PIN	__V___	PID fbk src	N/A	RWS_	7230	LST_032_V	
7221	$PIN	__V___	PID draw src	N/A	RWS_	7231	LST_033_V	
7221	$PIN	F_____	PID draw src	N/A	RWS_	7231	LST_033_F	
7221	$PIN	____B_	PID draw src	N/A	RWS_	7231	LST_033_B	
7221	$PIN	_S____	PID draw src	N/A	RWS_	7231	LST_033_S	
7222	$PIN	____B_	PID set 0 src	N/A	RWS_	7232	LST_034_B	
7222	$PIN	_S____	PID set 0 src	N/A	RWS_	7232	LST_034_S	
7222	$PIN	__V___	PID set 0 src	N/A	RWS_	7232	LST_034_V	
7222	$PIN	F_____	PID set 0 src	N/A	RWS_	7232	LST_034_F	
7223	$PIN	_S____	PID set 1 src	N/A	RWS_	7233	LST_035_S	
7223	$PIN	__V___	PID set 1 src	N/A	RWS_	7233	LST_035_V	
7223	$PIN	____B_	PID set 1 src	N/A	RWS_	7233	LST_035_B	
7223	$PIN	F_____	PID set 1 src	N/A	RWS_	7233	LST_035_F	
7226	$PIN	FSV_B_	PID seloff 0 src	N/A	RWS_	4000	LST_003	
7230	$PV	FSV_B_	Int PID fbk	%	RWS_	0.00F	-200.00F	200.00F
7231	$PV	FSV_B_	Int PID draw	%	RWS_	0.00F	-200.00F	200.00F
7232	$PV	FSV_B_	Int PID set 0	%	RWS_	0.00F	-200.00F	200.00F
7233	$PV	FSV_B_	Int PID set 1	%	RWS_	0.00F	-200.00F	200.00F
7236	$PV	FSV_B_	PID gain draw	NULL	RWS_	1.00F	-16.00F	16.00F
7237	$PP	FSV_B_	PID acc time	s	RWS_	1.00F	CALC	900.00F
7238	$PP	FSV_B_	PID dec time	s	RWS_	1.00F	CALC	900.00F

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
7239	$PP	FSV_B_	PID clamp bot	%	RWS_	-200.00F	-200.00F	200.00F
7240	$PP	FSV_B_	PID clamp top	%	RWS_	200.00F	-200.00F	200.00F
7250	$PP	FSV_B_	PID fbk mon	%	R___	0.00F	-200.00F	200.00F
7251	$PP	FSV_B_	PID draw mon	%	R___	0.00F	-200.00F	200.00F
7252	$PP	FSV_B_	PID set 0 mon	%	R___	0.00F	-200.00F	200.00F
7253	$PP	FSV_B_	PID set 1 mon	%	R___	0.00F	-200.00F	200.00F
7256	$PV	FSV_B_	PID input	%	R___	0.00F	-200.00F	200.00F
7260	$PIN	FSV_B_	PID PI enab src	N/A	RWS_	4000	LST_003	
7261	$PIN	FSV_B_	PID I freeze src	N/A	RWS_	4000	LST_003	
7263	$PP	FSV_B_	PI steady delay	s	RWS_	1.00F	CALC	CALC
7264	$PP	FSV_B_	PI steady thr	%	RWS_	0.00F	0.00F	200.00F
7265	$DV	FSV_B_	PID PI lock mon	N/A	R___	0	0	1
7270	$PP	FSV_B_	PI P1 gain %	%	RWS_	10.00F	0.00F	100.00F
7271	$PP	FSV_B_	PI I1 gain %	%	RWS_	60.00F	0.00F	100.00F
7272	$PP	FSV_B_	PI P2 gain %	%	RWS_	20.00F	0.00F	100.00F
7273	$PP	FSV_B_	PI I2 gain %	%	RWS_	50.00F	0.00F	100.00F
7274	$PP	FSV_B_	PI P3 gain %	%	RWS_	30.00F	0.00F	100.00F
7275	$PP	FSV_B_	PI I3 gain %	%	RWS_	40.00F	0.00F	100.00F
7276	$PP	FSV_B_	PIGP tran21 hthr	%	RWS_	50.00F	0.00F	100.00F
7277	$PP	FSV_B_	PIGP tran32 lthr	%	RWS_	20.00F	0.00F	100.00F
7278	$PP	FSV_B_	PIGP tran21 band	%	RWS_	5.00F	0.00F	100.00F
7279	$PP	FSV_B_	PIGP tran32 band	%	RWS_	5.00F	0.00F	100.00F
7280	$PIN	FSV_B_	PIGP ref src	N/A	RWS_	7281	LST_036	
7282	$PP	FSV_B_	PIGP ref mon	%	R___	0.00F	-200.00F	200.00F
7283	$PV	FSV_B_	PI Pnorm gain	%	R___	0.00F	0.00F	100.00F
7284	$PV	FSV_B_	PI Inorm gain	%	R___	0.00F	0.00F	100.00F
7290	$PV	FSV_B_	PI Pinit gain	%	RWS_	10.00F	0.00F	100.00F
7291	$PV	FSV_B_	PI Iinit gain	%	RWS_	10.00F	0.00F	100.00F
7292	$PP	FSV_B_	PI clamp top	NULL	RWS_	1.00F	-16.00F	16.00F
7293	$PP	FSV_B_	PI clamp bot	NULL	RWS_	-1.00F	-16.00F	16.00F
7294	$PV	FSV_B_	PID PI out mon	NULL	R___	0.00F	-16.00F	16.00F
7300	$PP	FSV_B_	PD P1 gain %	%	RWS_	10.00F	0.00F	100.00F
7301	$PP	FSV_B_	PD D1 gain %	%	RWS_	60.00F	0.00F	100.00F
7302	$PP	FSV_B_	PD P2 gain %	%	RWS_	20.00F	0.00F	100.00F
7303	$PP	FSV_B_	PD D2 gain %	%	RWS_	50.00F	0.00F	100.00F
7304	$PP	FSV_B_	PD P3 gain %	%	RWS_	30.00F	0.00F	100.00F
7305	$PP	FSV_B_	PD D3 gain %	%	RWS_	40.00F	0.00F	100.00F
7306	$PP	FSV_B_	PDGP tran21 hthr	%	RWS_	50.00F	0.00F	100.00F
7307	$PP	FSV_B_	PDGP tran32 lthr	%	RWS_	20.00F	0.00F	100.00F
7308	$PP	FSV_B_	PDGP tran21 band	%	RWS_	5.00F	0.00F	100.00F
7309	$PP	FSV_B_	PDGP tran32 band	%	RWS_	5.00F	0.00F	100.00F
7310	$PIN	FSV_B_	PDGP ref src	N/A	RWS_	7311	LST_037	
7311	$PV	FSV_B_	Int PDGP ref	%	RWS_	0.00F	-200.00F	200.00F
7312	$PV	FSV_B_	PD P gain mon	%	R___	0.00F	0.00F	100.00F
7313	$PV	FSV_B_	PD D gain mon	%	R___	0.00F	0.00F	100.00F
7314	$PP	FSV_B_	PDGP ref mon	%	R___	0.00F	-200.00F	200.00F
7320	$PIN	FSV_B_	PID Mlt PI sel 0	N/A	RWS_	4000	LST_003	
7321	$PIN	FSV_B_	PID Mlt PI sel 1	N/A	RWS_	4000	LST_003	
7322	$PIN	__V___	PID Mlt PI 3 src	N/A	RWS_	7326	LST_038_V	
7322	$PIN	_S____	PID Mlt PI 3 src	N/A	RWS_	7326	LST_038_S	
7322	$PIN	F_____	PID Mlt PI 3 src	N/A	RWS_	7326	LST_038_F	
7322	$PIN	____B_	PID Mlt PI 3 src	N/A	RWS_	7326	LST_038_B	
7324	$PP	FSV_B_	Int PID Mlt PI 1	NULL	RWS_	0.00F	-16.00F	16.00F
7325	$PP	FSV_B_	Int PID Mlt PI 2	NULL	RWS_	0.00F	-16.00F	16.00F
7326	$PV	FSV_B_	Int PID Mlt PI 3	NULL	RWS_	0.00F	-16.00F	16.00F
7327	$PP	FSV_B_	PID Mlt PI 0 mon	NULL	R___	0.00F	-16.00F	16.00F
7328	$PP	FSV_B_	PID Mlt PI 3 mon	NULL	R___	0.00F	-16.00F	16.00F
7329	$DP	FSV_B_	PID MltPI selmon	N/A	R___	0	0	3
7340	$PIN	FSV_B_	PID PD enab src	N/A	RWS_	4000	LST_003	
7342	$PP	FSV_B_	PD der filter	ms	RWS_	5.00F	CALC	CALC

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
7343	$PV	FSV_B_	PID PD out mon	%	R___	0.00F	-200.00F	200.00F
7350	$DP	FSV_B_	PID out sign	N/A	RWS_	0	0	1
7351	$PV	FSV_B_	PID out gain	NULL	RWS_	1.00F	-16.00F	+16.00F
7352	$PV	FSV_B_	PID out mon	%	R___	0.00F	-200.00F	200.00F
7353	$PV	FSV_B_	PID outS mon	%	R___	0.00F	-200.00F	200.00F
7360	$PP	FSV_B_	Max deviation	%	RWS_	90.00F	-200.00F	200.00F
7361	$PP	FSV_B_	Positioning spd	%	RWS_	0.00F	-200.00F	200.00F
7362	$FK	FSV_B_	Gear box ratio	NULL	RWS_	1.00F	0.001F	1.00F
7363	$FK	FSV_B_	Dancer constant	mm	RWS_	1.00F	1.0F	10000.00F
7364	$FK	FSV_B_	Minimum diameter	mm	RWS_	1.00F	1.00F	2000.00F
7365	$FK	FSV_B_	Diameter	mm	RW__	1.00F	1.00F	2000.00F
7366	$PP	FSV_B_	Diacal PI out	NULL	RW__	+1.00F	-16.00F	+16.00F
7370	$PP	FSV_B_	DCDelta error	cnt	R___	0.00F	0.00F	0.00F
7371	$PP	FSV_B_	DCDelta pos	NULL	R___	0.00F	0.00F	0.00F
7402	$PIN	FSV_B_	DiaClc start src	N/A	RWS_	4000	LST_003	
8000	$PV	FSV_B_	Jog 0	rpm	RWS_	100.00F	0.00F	0.00F
8001	$PP	FSV_B_	Jog 1	rpm	RWS_	0.00F	0.00F	0.00F
8002	$PP	FSV_B_	Jog 2	rpm	RWS_	0.00F	0.00F	0.00F
8003	$PP	FSV_B_	Jog 3	rpm	RWS_	0.00F	0.00F	0.00F
8004	$PV	FSV_B_	Jog acc dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8005	$PV	FSV_B_	Jog acc dlt time	s	RWS_	10.00F	0.50F	10000.0F
8006	$PV	FSV_B_	Jog dec dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8007	$PV	FSV_B_	Jog dec dlt time	s	RWS_	10.00F	0.50F	10000.0F
8010	$PP	FSV_B_	Jog 0 mon	rpm	R___	0.00F	0.00F	0.00F
8011	$DP	FSV_B_	Jog sel mon	N/A	R___	0	0	3
8012	$PV	FSV_B_	Jog output	rpm	R___	0.00F	0.00F	0.00F
8013	$DV	FSV_B_	Jog state	N/A	R___	0	0	1
8014	$PIN	_S____	Jog 0 src	N/A	RWS_	8000	LST_012_S	
8014	$PIN	F_V_B_	Jog 0 src	N/A	RWS_	8000	LST_012_FVB	
8015	$PIN	FSV_B_	Jog cmd src	N/A	RWS_	4000	LST_003	
8016	$PIN	FSV_B_	Jog sel 0 src	N/A	RWS_	4000	LST_003	
8017	$PIN	FSV_B_	Jog sel 1 src	N/A	RWS_	4000	LST_003	
8018	$PIN	FSV_B_	Jog invers src	N/A	RWS_	4000	LST_003	
8021	$DV	FSV_B_	Ramp shape	N/A	RWS_	0	0	1
8022	$PV	FSV_B_	Ramp out mon	rpm	R___	0.00F	0.00F	0.00F
8023	$DV	FSV_B_	Ramp acc state	N/A	R___	0	0	1
8024	$DV	FSV_B_	Ramp dec state	N/A	R___	0	0	1
8025	$DV	FSV_B_	Ramp out != 0	N/A	R___	0	0	1
8026	$DP	FSV_B_	Ramp cmds mon	N/A	R___	0	0	15
8027	$PIN	FSV_B_	Ramp input=0	N/A	RWS_	4000	LST_003	
8028	$PIN	FSV_B_	Ramp output=0	N/A	RWS_	4000	LST_003	
8029	$PIN	FSV_B_	Ramp freeze	N/A	RWS_	4000	LST_003	
8031	$DP	FSV_B_	Ramp out enable	N/A	WS_Z	1	0	1
8040	$PP	FSV_B_	MR0 acc dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8041	$PP	FSV_B_	MR0 acc dlt time	s	RWS_	10.00F	0.50F	10000.0F
8042	$PP	FSV_B_	MR0 dec dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8043	$PP	FSV_B_	MR0 dec dlt time	s	RWS_	10.00F	0.50F	10000.0F
8044	$PP	FSV_B_	MR0 fdec dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8045	$PP	FSV_B_	MR0 fdec dlttime	s	RWS_	10.00F	0.50F	10000.0F
8046	$PP	FSV_B_	MR0 acc S curve	s	RWS_	0.10F	0.00F	0.00F
8047	$PP	FSV_B_	MR0 dec S curve	s	RWS_	0.10F	0.00F	0.00F
8050	$PP	FSV_B_	MR1 acc dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8051	$PP	FSV_B_	MR1 acc dlt time	s	RWS_	10.00F	0.50F	10000.0F
8052	$PP	FSV_B_	MR1 dec dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8053	$PP	FSV_B_	MR1 dec dlt time	s	RWS_	10.00F	0.50F	10000.0F
8054	$PP	FSV_B_	MR1 fdec dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8055	$PP	FSV_B_	MR1 fdec dlttime	s	RWS_	10.00F	0.50F	10000.0F
8056	$PP	FSV_B_	MR1 acc S curve	s	RWS_	0.10F	0.00F	0.00F
8057	$PP	FSV_B_	MR1 dec S curve	s	RWS_	0.10F	0.00F	0.00F
8060	$PP	FSV_B_	MR2 acc dlt spd	rpm	RWS_	1000.00F	1.00F	CALC

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
8061	$PP	FSV_B_	MR2 acc dlt time	s	RWS_	10.00F	0.50F	10000.0F
8062	$PP	FSV_B_	MR2 dec dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8063	$PP	FSV_B_	MR2 dec dlt time	s	RWS_	10.00F	0.50F	10000.0F
8064	$PP	FSV_B_	MR2 fdec dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8065	$PP	FSV_B_	MR2 fdec dlttime	s	RWS_	10.00F	0.50F	10000.0F
8066	$PP	FSV_B_	MR2 acc S curve	s	RWS_	0.10F	0.00F	0.00F
8067	$PP	FSV_B_	MR2 dec S curve	s	RWS_	0.10F	0.00F	0.00F
8070	$PP	FSV_B_	MR3 acc dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8071	$PP	FSV_B_	MR3 acc dlt time	s	RWS_	10.00F	0.50F	10000.0F
8072	$PP	FSV_B_	MR3 dec dlt spd	rpm	RWS_	1000.00F	1.00F	CALC
8073	$PP	FSV_B_	MR3 dec dlt time	s	RWS_	10.00F	0.50F	10000.0F
8074	$PP	FSV_B_	MR3 fdec dlt spd	rpm	RWS_	10000.00F	1.00F	CALC
8075	$PP	FSV_B_	MR3 fdec dlttime	s	RWS_	10.00F	0.50F	10000.0F
8076	$PP	FSV_B_	MR3 acc S curve	s	RWS_	0.10F	0.00F	0.00F
8077	$PP	FSV_B_	MR3 dec S curve	s	RWS_	0.10F	0.00F	0.00F
8078	$DP	FSV_B_	Mlt ramp sel mon	N/A	R___	0	0	3
8080	$DP	FSV_B_	FRC cmd mon	N/A	R___	0	0	3
8081	$DV	FSV_B_	FRC invers	N/A	R___	0	0	1
8082	$DV	FSV_B_	FRC alarm	N/A	R___	0	0	1
8083	$PIN	FSV_B_	Forward src	N/A	RWS_	4001	LST_003	
8084	$PIN	FSV_B_	Reverse src	N/A	RWS_	4000	LST_003	
8090	$PIN	FSV_B_	Mlt ramp s0 src	N/A	RWS_	4000	LST_003	
8091	$PIN	FSV_B_	Mlt ramp s1 src	N/A	RWS_	4000	LST_003	
8998	$DP	FSV_B_	Last SBI error	N/A	R___	0	0	0
8999	$DK	FSVABT	SBI enable	N/A	RWS_	0	0	1
9000	$PV	FSV_B_	SBI Drv W0 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9001	$PV	FSV_B_	SBI Drv W1 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9002	$PV	FSV_B_	SBI Drv W2 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9003	$PV	FSV_B_	SBI Drv W3 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9004	$PV	FSV_B_	SBI Drv W4 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9005	$PV	FSV_B_	SBI Drv W5 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9010	$PIN	_S____	Drv SBI W0 src	N/A	RWS_	9020	LST_040_S	
9010	$PIN	__V___	Drv SBI W0 src	N/A	RWS_	9020	LST_040_V	
9010	$PIN	____B_	Drv SBI W0 src	N/A	RWS_	9020	LST_040_B	
9010	$PIN	F_____	Drv SBI W0 src	N/A	RWS_	9020	LST_040_F	
9011	$PIN	F_____	Drv SBI W1 src	N/A	RWS_	9021	LST_040_F	
9011	$PIN	__V___	Drv SBI W1 src	N/A	RWS_	9021	LST_040_V	
9011	$PIN	____B_	Drv SBI W1 src	N/A	RWS_	9021	LST_040_B	
9011	$PIN	_S____	Drv SBI W1 src	N/A	RWS_	9021	LST_040_S	
9012	$PIN	F_____	Drv SBI W2 src	N/A	RWS_	9022	LST_040_F	
9012	$PIN	_S____	Drv SBI W2 src	N/A	RWS_	9022	LST_040_S	
9012	$PIN	__V___	Drv SBI W2 src	N/A	RWS_	9022	LST_040_V	
9012	$PIN	____B_	Drv SBI W2 src	N/A	RWS_	9022	LST_040_B	
9013	$PIN	_S____	Drv SBI W3 src	N/A	RWS_	9023	LST_040_S	
9013	$PIN	__V___	Drv SBI W3 src	N/A	RWS_	9023	LST_040_V	
9013	$PIN	F_____	Drv SBI W3 src	N/A	RWS_	9023	LST_040_F	
9013	$PIN	____B_	Drv SBI W3 src	N/A	RWS_	9023	LST_040_B	
9014	$PIN	____B_	Drv SBI W4 src	N/A	RWS_	9024	LST_040_B	
9014	$PIN	__V___	Drv SBI W4 src	N/A	RWS_	9024	LST_040_V	
9014	$PIN	_S____	Drv SBI W4 src	N/A	RWS_	9024	LST_040_S	
9014	$PIN	F_____	Drv SBI W4 src	N/A	RWS_	9024	LST_040_F	
9015	$PIN	__V___	Drv SBI W5 src	N/A	RWS_	9025	LST_040_V	
9015	$PIN	_S____	Drv SBI W5 src	N/A	RWS_	9025	LST_040_S	
9015	$PIN	F_____	Drv SBI W5 src	N/A	RWS_	9025	LST_040_F	
9015	$PIN	____B_	Drv SBI W5 src	N/A	RWS_	9025	LST_040_B	
9020	$PV	FSV_B_	Int Drv SBI W0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9021	$PV	FSV_B_	Int Drv SBI W1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9022	$PV	FSV_B_	Int Drv SBI W2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9023	$PV	FSV_B_	Int Drv SBI W3	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9024	$PV	FSV_B_	Int Drv SBI W4	NULL	RWS_	0.00F	INT_MIN	INT_MAX

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
9025	$PV	FSV_B_	Int Drv SBI W5	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9030	$PP	FSV_B_	Drv SBI W0 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9031	$PP	FSV_B_	Drv SBI W1 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9032	$PP	FSV_B_	Drv SBI W2 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9033	$PP	FSV_B_	Drv SBI W3 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9034	$PP	FSV_B_	Drv SBI W4 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9035	$PP	FSV_B_	Drv SBI W5 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9040	$DP	FSVABT	DOL activity	N/A	RWS_	3	1	6
9041	$DP	FSVABT	MOL activity	N/A	RWS_	3	1	6
9042	$DP	FSVABT	SFL activity	N/A	RWS_	3	1	6
9043	$PP	FSVABT	UVR attempts	NULL	RWS_	5.00F	1.00F	1000.0F
9044	$PP	FSVABT	UVR delay	s	RWS_	240.00F	1.00F	CALC
9046	$DP	FSVABT	DS restart	N/A	RWS_	0	0	1
9047	$PP	FSVABT	DS restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9049	$DP	FSVABT	ACF activity	N/A	RWS_	3	2	6
9050	$DP	FSVABT	UV restart	N/A	RWS_	0	0	1
9051	$PP	FSVABT	UV restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9052	$DP	FSVABT	OV restart	N/A	RWS_	0	0	1
9053	$PP	FSVABT	OV restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9054	$DP	FSVABT	HTS activity	N/A	RWS_	3	2	6
9055	$DP	FSVABT	HTS restart	N/A	RWS_	0	0	1
9056	$PP	FSVABT	HTS restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9057	$DP	FSVABT	RGS activity	N/A	RWS_	3	2	6
9058	$DP	FSVABT	RGS restart	N/A	RWS_	0	0	1
9059	$PP	FSVABT	RGS restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9060	$DP	FSVABT	EF activity	N/A	RWS_	3	2	6
9061	$DP	FSVABT	EF restart	N/A	RWS_	0	0	1
9062	$PP	FSVABT	EF restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9063	$DP	FSVABT	IOC restart	N/A	RWS_	0	0	1
9064	$PP	FSVABT	IOC restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9065	$DP	FSVABT	MOT activity	N/A	RWS_	3	2	6
9066	$DP	FSVABT	MOT restart	N/A	RWS_	0	0	1
9067	$PP	FSVABT	MOT restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9068	$DP	FSVABT	ISB activity	N/A	RWS_	3	2	6
9069	$DP	FSVABT	ISB restart	N/A	RWS_	0	0	1
9070	$PP	FSVABT	ISB restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9071	$DP	FSVABT	BUOL activity	N/A	RWS_	3	2	6
9072	$PV	FSVABT	HT sensor temp	C	R___	0.00F	0.00F	0.00F
9073	$PV	FSVABT	RG sensor temp	C	R___	0.00F	0.00F	0.00F
9074	$DP	FSVABT	CCF activity	N/A	RWS_	3	2	6
9075	$PIN	FSV_B_	EF src	N/A	RWS_	4000	LST_003	
9076	$PIN	FSV_B_	Fault reset src	N/A	RWS_	4000	LST_003	
9076	$PIN	___A_T	Fault reset src	N/A	RWS_	4000	LST_041	
9086	$DP	FSVABT	FRC activity	N/A	RWS_	3	2	6
9087	$DP	FSVABT	IAS activity	N/A	RWS_	3	2	6
9088	$DP	FSVABT	IAS restart	N/A	RWS_	0	0	1
9089	$PP	FSVABT	IAS restart time	ms	RWS_	1000.00F	0.00F	30000.0F
9090	$DV	FSV_B_	Sequencer status	N/A	R___	0	0	0xffff
9095	$PV	FSVABT	IA sensor temp	C	R___	0.00F	0.00F	0.00F
9100	$PV	FSV_B_	Pad 0		RWS_	0.00F	INT_MIN	INT_MAX
9101	$PV	FSV_B_	Pad 1		RWS_	0.00F	INT_MIN	INT_MAX
9102	$PV	FSV_B_	Pad 2		RWS_	0.00F	INT_MIN	INT_MAX
9103	$PV	FSV_B_	Pad 3		RWS_	0.00F	INT_MIN	INT_MAX
9104	$PV	FSV_B_	Pad 4		RWS_	0.00F	INT_MIN	INT_MAX
9105	$PV	FSV_B_	Pad 5		RWS_	0.00F	INT_MIN	INT_MAX
9106	$PV	FSV_B_	Pad 6		RWS_	0.00F	INT_MIN	INT_MAX
9107	$PV	FSV_B_	Pad 7		RWS_	0.00F	INT_MIN	INT_MAX
9108	$PV	FSV_B_	Pad 8		RWS_	0.00F	INT_MIN	INT_MAX
9109	$PV	FSV_B_	Pad 9		RWS_	0.00F	INT_MIN	INT_MAX
9110	$PV	FSV_B_	Pad 10		RWS_	0.00F	INT_MIN	INT_MAX

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
9111	$PV	FSV_B_	Pad 11		RWS_	0.00F	INT_MIN	INT_MAX
9112	$PV	FSV_B_	Pad 12		RWS_	0.00F	INT_MIN	INT_MAX
9113	$PV	FSV_B_	Pad 13		RWS_	0.00F	INT_MIN	INT_MAX
9114	$PV	FSV_B_	Pad 14		RWS_	0.00F	INT_MIN	INT_MAX
9115	$PV	FSV_B_	Pad 15		RWS_	0.00F	INT_MIN	INT_MAX
9116	$DV	FSV_B_	Dig pad 0	N/A	RWS_	0	0	1
9117	$DV	FSV_B_	Dig pad 1	N/A	RWS_	0	0	1
9118	$DV	FSV_B_	Dig pad 2	N/A	RWS_	0	0	1
9119	$DV	FSV_B_	Dig pad 3	N/A	RWS_	0	0	1
9120	$DV	FSV_B_	Dig pad 4	N/A	RWS_	0	0	1
9121	$DV	FSV_B_	Dig pad 5	N/A	RWS_	0	0	1
9122	$DV	FSV_B_	Dig pad 6	N/A	RWS_	0	0	1
9123	$DV	FSV_B_	Dig pad 7	N/A	RWS_	0	0	1
9124	$DV	FSV_B_	Dig pad 8	N/A	RWS_	0	0	1
9125	$DV	FSV_B_	Dig pad 9	N/A	RWS_	0	0	1
9126	$DV	FSV_B_	Dig pad 10	N/A	RWS_	0	0	1
9127	$DV	FSV_B_	Dig pad 11	N/A	RWS_	0	0	1
9128	$DV	FSV_B_	Dig pad 12	N/A	RWS_	0	0	1
9129	$DV	FSV_B_	Dig pad 13	N/A	RWS_	0	0	1
9130	$DV	FSV_B_	Dig pad 14	N/A	RWS_	0	0	1
9131	$DV	FSV_B_	Dig pad 15	N/A	RWS_	0	0	1
9210	$PIN	FSV_B_	Term Start src	N/A	RWS_	4000	LST_016	
9211	$PIN	FSV_B_	Term Stop src	N/A	RWS_	4000	LST_016	
9215	$PP	FSVABT	Tphase threshold	%	RWS_	95.00F	10.00F	100.00F
9216	$DP	FSVABT	Tphase in alarm	N/A	RW__	0	0	32
9220	$DP	FSVABT	OS activity	N/A	RWS_	3	2	6
9221	$PP	FSVABT	OS threshold	rpm	RWS_	3000.00F	CALC	CALC
9230	$DP	FSVABT	Test phase	N/A	RWS_	0	0	32
9231	$PV	FSVABT	Exe phase	%	R___	0.00F	0.00F	0.00F
9232	$PV	FSVABT	Min phase	%	R___	0.00F	0.00F	0.00F
9233	$PV	FSVABT	Max phase	%	R___	0.00F	0.00F	0.00F
9300	$PV	FSV_B_	ISBus Drv W0 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9301	$PV	FSV_B_	ISBus Drv W1 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9302	$PV	FSV_B_	ISBus Drv W2 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9303	$PV	FSV_B_	ISBus Drv W3 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9304	$PV	FSV_B_	ISBus Drv W4 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9305	$PV	FSV_B_	ISBus Drv W5 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9306	$PV	FSV_B_	ISBus Drv W6 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9307	$PV	FSV_B_	ISBus Drv W7 mon	NULL	R___	0.00F	INT_MIN	INT_MAX
9320	$PV	FSV_B_	Int Drv ISBus W0	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9321	$PV	FSV_B_	Int Drv ISBus W1	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9322	$PV	FSV_B_	Int Drv ISBus W2	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9323	$PV	FSV_B_	Int Drv ISBus W3	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9324	$PV	FSV_B_	Int Drv ISBus W4	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9325	$PV	FSV_B_	Int Drv ISBus W5	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9326	$PV	FSV_B_	Int Drv ISBus W6	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9327	$PV	FSV_B_	Int Drv ISBus W7	NULL	RWS_	0.00F	INT_MIN	INT_MAX
9340	$PIN	F_____	Word1 B0 src	N/A	RWS_	4000	LST_001_F	
9340	$PIN	_S____	Word1 B0 src	N/A	RWS_	4000	LST_001_S	
9340	$PIN	__V___	Word1 B0 src	N/A	RWS_	4000	LST_001_V	
9340	$PIN	____B_	Word1 B0 src	N/A	RWS_	4000	LST_001_B	
9341	$PIN	_S____	Word1 B1 src	N/A	RWS_	4000	LST_001_S	
9341	$PIN	____B_	Word1 B1 src	N/A	RWS_	4000	LST_001_B	
9341	$PIN	__V___	Word1 B1 src	N/A	RWS_	4000	LST_001_V	
9341	$PIN	F_____	Word1 B1 src	N/A	RWS_	4000	LST_001_F	
9342	$PIN	____B_	Word1 B2 src	N/A	RWS_	4000	LST_001_B	
9342	$PIN	__V___	Word1 B2 src	N/A	RWS_	4000	LST_001_V	
9342	$PIN	F_____	Word1 B2 src	N/A	RWS_	4000	LST_001_F	
9342	$PIN	_S____	Word1 B2 src	N/A	RWS_	4000	LST_001_S	
9343	$PIN	F_____	Word1 B3 src	N/A	RWS_	4000	LST_001_F	

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
9343	$PIN	_S____	Word1 B3 src	N/A	RWS_	4000	LST_001_S	
9343	$PIN	__V___	Word1 B3 src	N/A	RWS_	4000	LST_001_V	
9343	$PIN	____B_	Word1 B3 src	N/A	RWS_	4000	LST_001_B	
9344	$PIN	____B_	Word1 B4 src	N/A	RWS_	4000	LST_001_B	
9344	$PIN	__V___	Word1 B4 src	N/A	RWS_	4000	LST_001_V	
9344	$PIN	F_____	Word1 B4 src	N/A	RWS_	4000	LST_001_F	
9344	$PIN	_S____	Word1 B4 src	N/A	RWS_	4000	LST_001_S	
9345	$PIN	____B_	Word1 B5 src	N/A	RWS_	4000	LST_001_B	
9345	$PIN	__V___	Word1 B5 src	N/A	RWS_	4000	LST_001_V	
9345	$PIN	F_____	Word1 B5 src	N/A	RWS_	4000	LST_001_F	
9345	$PIN	_S____	Word1 B5 src	N/A	RWS_	4000	LST_001_S	
9346	$PIN	_S____	Word1 B6 src	N/A	RWS_	4000	LST_001_S	
9346	$PIN	__V___	Word1 B6 src	N/A	RWS_	4000	LST_001_V	
9346	$PIN	F_____	Word1 B6 src	N/A	RWS_	4000	LST_001_F	
9346	$PIN	____B_	Word1 B6 src	N/A	RWS_	4000	LST_001_B	
9347	$PIN	F_____	Word1 B7 src	N/A	RWS_	4000	LST_001_F	
9347	$PIN	_S____	Word1 B7 src	N/A	RWS_	4000	LST_001_S	
9347	$PIN	__V___	Word1 B7 src	N/A	RWS_	4000	LST_001_V	
9347	$PIN	____B_	Word1 B7 src	N/A	RWS_	4000	LST_001_B	
9348	$PIN	_S____	Word1 B8 src	N/A	RWS_	4000	LST_001_S	
9348	$PIN	__V___	Word1 B8 src	N/A	RWS_	4000	LST_001_V	
9348	$PIN	____B_	Word1 B8 src	N/A	RWS_	4000	LST_001_B	
9348	$PIN	F_____	Word1 B8 src	N/A	RWS_	4000	LST_001_F	
9349	$PIN	_S____	Word1 B9 src	N/A	RWS_	4000	LST_001_S	
9349	$PIN	____B_	Word1 B9 src	N/A	RWS_	4000	LST_001_B	
9349	$PIN	F_____	Word1 B9 src	N/A	RWS_	4000	LST_001_F	
9349	$PIN	__V___	Word1 B9 src	N/A	RWS_	4000	LST_001_V	
9350	$PIN	F_____	Word1 B10 src	N/A	RWS_	4000	LST_001_F	
9350	$PIN	_S____	Word1 B10 src	N/A	RWS_	4000	LST_001_S	
9350	$PIN	__V___	Word1 B10 src	N/A	RWS_	4000	LST_001_V	
9350	$PIN	____B_	Word1 B10 src	N/A	RWS_	4000	LST_001_B	
9351	$PIN	____B_	Word1 B11 src	N/A	RWS_	4000	LST_001_B	
9351	$PIN	F_____	Word1 B11 src	N/A	RWS_	4000	LST_001_F	
9351	$PIN	_S____	Word1 B11 src	N/A	RWS_	4000	LST_001_S	
9351	$PIN	__V___	Word1 B11 src	N/A	RWS_	4000	LST_001_V	
9352	$PIN	__V___	Word1 B12 src	N/A	RWS_	4000	LST_001_V	
9352	$PIN	____B_	Word1 B12 src	N/A	RWS_	4000	LST_001_B	
9352	$PIN	_S____	Word1 B12 src	N/A	RWS_	4000	LST_001_S	
9352	$PIN	F_____	Word1 B12 src	N/A	RWS_	4000	LST_001_F	
9353	$PIN	F_____	Word1 B13 src	N/A	RWS_	4000	LST_001_F	
9353	$PIN	____B_	Word1 B13 src	N/A	RWS_	4000	LST_001_B	
9353	$PIN	__V___	Word1 B13 src	N/A	RWS_	4000	LST_001_V	
9353	$PIN	_S____	Word1 B13 src	N/A	RWS_	4000	LST_001_S	
9354	$PIN	_S____	Word1 B14 src	N/A	RWS_	4000	LST_001_S	
9354	$PIN	__V___	Word1 B14 src	N/A	RWS_	4000	LST_001_V	
9354	$PIN	F_____	Word1 B14 src	N/A	RWS_	4000	LST_001_F	
9354	$PIN	____B_	Word1 B14 src	N/A	RWS_	4000	LST_001_B	
9355	$PIN	F_____	Word1 B15 src	N/A	RWS_	4000	LST_001_F	
9355	$PIN	_S____	Word1 B15 src	N/A	RWS_	4000	LST_001_S	
9355	$PIN	__V___	Word1 B15 src	N/A	RWS_	4000	LST_001_V	
9355	$PIN	____B_	Word1 B15 src	N/A	RWS_	4000	LST_001_B	
9356	$DV	FSV_B_	W1 comp out	N/A	R___	0	0	0xffff
9360	$DV	FSV_B_	W1 decomp inp	N/A	RWS_	0	0	0xffff
9361	$PIN	F_____	W1 decomp src	N/A	RWS_	9360	LST_027_F	
9361	$PIN	_S____	W1 decomp src	N/A	RWS_	9360	LST_027_S	
9361	$PIN	__V___	W1 decomp src	N/A	RWS_	9360	LST_027_V	
9361	$PIN	____B_	W1 decomp src	N/A	RWS_	9360	LST_027_B	
9362	$DP	FSV_B_	W1 decomp mon	N/A	R___	0	0	0xffff
9363	$DV	FSV_B_	B0 W1 decomp	N/A	R___	0	0	1
9364	$DV	FSV_B_	B1 W1 decomp	N/A	R___	0	0	1

Ipa	Point type	Vality DB	Description	fs unit	Access mode	Default	Min	Max
9365	$DV	FSV_B_	B2 W1 decomp	N/A	R___	0	0	1
9366	$DV	FSV_B_	B3 W1 decomp	N/A	R___	0	0	1
9367	$DV	FSV_B_	B4 W1 decomp	N/A	R___	0	0	1
9368	$DV	FSV_B_	B5 W1 decomp	N/A	R___	0	0	1
9369	$DV	FSV_B_	B6 W1 decomp	N/A	R___	0	0	1
9370	$DV	FSV_B_	B7 W1 decomp	N/A	R___	0	0	1
9371	$DV	FSV_B_	B8 W1 decomp	N/A	R___	0	0	1
9372	$DV	FSV_B_	B9 W1 decomp	N/A	R___	0	0	1
9373	$DV	FSV_B_	B10 W1 decomp	N/A	R___	0	0	1
9374	$DV	FSV_B_	B11 W1 decomp	N/A	R___	0	0	1
9375	$DV	FSV_B_	B12 W1 decomp	N/A	R___	0	0	1
9376	$DV	FSV_B_	B13 W1 decomp	N/A	R___	0	0	1
9377	$DV	FSV_B_	B14 W1 decomp	N/A	R___	0	0	1
9378	$DV	FSV_B_	B15 W1 decomp	N/A	R___	0	0	1
9500	$FK	FS__B_	Test torque ref	Nm	RWS_	CALC	0.00F	0.00F
9501	$FK	FS__B_	Measured Inertia	kgm2	RW__	CALC	0.00F	0.00F
9502	$FK	FS__B_	Measured Frict	Nm	RW__	CALC	0.00F	0.00F
9526	$PP	____B_	Rho	cnt	RW__	0.00F	0.00F	0.00F
9527	$DP	____B_	Sin-Cos/Res pos	N/A	R___	0	0	0x0000
9528	$DV	____B_	Hall sensor	N/A	R___	0	0	0x0000
9529	$DP	____B_	Hall offset	N/A	RWS_	0	0	0x0000
9550	$DV	F___B_	Index storing en	N/A	RWS_	0	0	3
9551	$DV	F___B_	Int IS ctrl	N/A	RWS_	0	0	0xffff
9553	$PV	F___B_	Std enc position	cnt	R___	0.00F	0.00F	0.00F
9554	$PV	F___B_	Exp enc position	cnt	R___	0.00F	0.00F	0.00F
9555	$DV	F___B_	H Index register	N/A	R___	0	0	0xffff
9556	$DV	F___B_	L Index register	N/A	R___	0	0	0xffff
9557	$PIN	F___B_	IS ctrl src	N/A	RWS_	9551	LST_039	
9600	$PP	FSV_B_	EF hold off	ms	RWS_	0.00F	0.00F	30000.0F
9603	$PP	FSVABT	MOT hold off	ms	RWS_	1000.00F	0.00F	30000.0F
9604	$PP	FSVABT	HTS hold off	ms	RWS_	1000.0F	0.00F	30000.0F
9605	$PP	FSVABT	RGS hold off	ms	RWS_	1000.0F	0.00F	30000.0F
9606	$PP	FSVABT	IAS hold off	ms	RWS_	1000.00F	0.00F	30000.0F
9607	$PP	FSVABT	FRC hold off	ms	RWS_	32.00F	0.00F	30000.0F
9608	$PP	FSVABT	OS hold off	ms	RWS_	0.00F	0.00F	30000.0F
9610	$DP	FSVABT	Mask W1 S1	N/A	RWS_	0xffff	0	0xffff
9611	$DP	FSVABT	Mask W2 S1	N/A	RWS_	0xffff	0	0xffff
9612	$DP	FSVABT	Mask W3 S1	N/A	RWS_	0xffff	0	0xffff
9614	$DP	FSVABT	Mask W1 S2	N/A	RWS_	0xffff	0	0xffff
9615	$DP	FSVABT	Mask W2 S2	N/A	RWS_	0xffff	0	0xffff
9616	$DP	FSVABT	Mask W3 S2	N/A	RWS_	0xffff	0	0xffff
9630	$DV	FSVABT	Alm W1 S1	N/A	R___	0	0	0xffff
9631	$DV	FSVABT	Alm W2 S1	N/A	R___	0	0	0xffff
9632	$DV	FSVABT	Alm W3 S1	N/A	R___	0	0	0xffff
9634	$DV	FSVABT	Alm W1 S2	N/A	R___	0	0	0xffff

4. WARRANTY PARTS AND SERVICE

The purpose of this section is to provide specific instructions to the user of the standard drive referenced in this book regarding warranty administration and how to obtain assistance on both in-warranty and out-of-warranty equipment.

If assistance is required to determine warranty status, identify defective parts, or obtain the name of your local distributor, call:

Saftronics, Inc.

5580 Enterprise Parkway

Fort Myers, FL 33905

Phone: + 1 941 693 7200

Fax: + 1 941 693 2431

("+" indicates the international access code required when calling from outside of the USA.)

WARRANTY COVERAGE

The warranty covers all major parts of the drive such as the main printed circuit boards, transistor modules, etc. The warranty does not cover replacement of fuses or of the entire drive.

"Warranty period is 12 months after installation or 18 months after shipment from the Company, whichever occurs first".

However, the guarantee will not apply in the following cases, even if the guarantee term has not expired:

1. Damage was caused by incorrect use or inappropriate repair or modification.
2. The product was used in an environment outside the standard specified range.
3. Damage was caused by dropping the product after purchase or occurred during transportation.
4. Damage was caused by an earthquake, fire, flooding, lightning, abnormal voltage, or other natural calamities and secondary disasters.

Before calling the number at left to determine warranty status, the drive serial number will be required. This is located on the drive nameplate.

OUT-OF WARRANTY PROCEDURES

When the defective part has been identified, contact your local authorized Saftronics standard drives distributor to order replacement parts.

MOTORS

Please complete and return warranty registration card located inside back cover.

5580 Enterprise Parkway, Fort Myers, Florida 33905 • Telephone (941) 693-7200 • Fax (941) 693-2431

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