VS65

Series

MEDIUM VOLTAGE SOFTSTARTER

Medium Voltage Soft Starter

Programming and Software Manual

POWER ELECTRONICS®

VS65 Series

MEDIUM VOLTAGE SOFT STARTER

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Programming and Software Manual

Edition: July 2012

VS65MTSW01AI Rev. A

SAFETY SYMBOLS

In order to reduce the risk of personal injury, electric shock, fire and damage to equipment, please read carefully and pay attention to the precautions found in this manual.

	**ALARM SAFETY WARNING**	This symbol indicates the presence of potential hazard, which may result in serious personal injury when instructions are omitted or not followed properly.
	**CAUTION**	Identifies shock hazards under certain conditions. Particular attention should be given due to the presence of dangerous voltage. Maintenance operations should be carried out by qualified personnel.
		Identifies potential hazards under certain conditions. Read the message and follow the instructions carefully.
		Identifies electric shock hazards under certain conditions. Particular attention should be given due to the presence of dangerous voltage.

July 2012 Edition

This publication could show technical imprecision or misprints. The information here included would be periodically modified and updated, included in later editions. To consult or download the latest information related to this product, please contact our website www.power-electronics.com.

REVISION CONTROL		
DATE	**REVISION**	**DESCRIPTION**
12 July 2012	A	First Edition

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SAFETY INSTRUCTIONS

¡IMPORTANT!

The safety measures shown in the manual are intended to teach the user to use the product properly and as safely as possible to prevent any personal injury or material damage.

DANGER	CAUTION	ALARM
DANGEROUS VOLTAGE The medium voltage soft starters have dangerous voltages when connected to line voltage. Install and maintenance operations should be carried out by qualified personnel only. An improper motor or soft starter installation may cause faults in the equipment, serious injuries including death. Follow carefully the instructions given in the manual, the national electric codes and updated local codes.	**SHORT CIRCUIT** Medium Voltage soft starters are not tested against short circuits. In case of a severe overload or short circuit, the soft starter should be completely tested to keep the equipment in working order.	**GENERAL PROTECTIONS AND EARTH GOUNDING.** The installer or user is responsible to provide a proper soft starter earthing system and a complete protections system in accordance with the national electric codes and updated local codes.

ALARM – SAFETY – CAUTION

Read carefully this manual and follow the instructions before proceeding.

All of the safety instructions would not cover every single potential equipment cause. However, the most common and important ones have been pointed out. The installer should follow the instructions described within the manual, provide quality electric work and localise all of the recommendations and warnings provided before starting the equipment.

Make sure the soft starter is completely disconnected from the power supply and earth grounded before any use or maintenance operation is carried out.

Check the maintenance section before proceeding. In order to prevent electric risks, disconnect the power supply input, earth ground the equipment and remove the control voltages before working in the equipment. Warning and safety labels should be properly placed in terminals, covers and control panels in accordance with local codes. Otherwise, electric shock hazard exists.

Do not connect any kind of power supply to the equipment while the doors are opened.
Totally prohibited to run the soft starter with the doors opened.

Once doors are properly closed, the power supply may be connected to the equipments power supply line. Otherwise, electric shock hazard exists.

Do not open the soft starter doors except for periodic inspections, wiring the unit even when the input voltage is not connected.
Otherwise, you may suffer an electric shock.

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ALARM – SAFETY – CAUTION

Power factor compensation capacitors.

The reactive compensation capacitors used to increase the power factor should be connected to the soft starter input terminals and not to the output ones. These capacitors should be connected with an additional contactor as shown in the electric connections section. The connection will be done only when the soft starter is running and it will be disconnected during the acceleration and deceleration ramp.

Otherwise, the soft starter can be damaged.

When working in electric installations always remember to apply the 5 golden rules:

1. Visible cut of all the voltage sources.
2. Mechanic lock of every single cut elements.
3. Verify no voltage is present.
4. Earth ground and short circuit any possible voltage source.
5. Define and post sign the working area.

CAUTION

Handle the equipment with dry hands.
Otherwise, electric shock hazard existence.

Do not use cables with damaged insulation. Do not summit cables to abrasions, excessive stress, heavy loads or pinching.
Otherwise, electric shock hazard existence.

Keep clean the equipment, not allowing lint, paper, wooden chips, dust, metallic chips or other foreign matter (screws, pressure washers…) into the soft starter. Verify this point after the installation.
Otherwise, accident and fire risk existence.

Place the soft starter over non-flammable surface. Keep away from flammable materials.
Otherwise, fire risk existence.

Disconnect and earth ground the soft starter power input when the soft starter is damaged.
Otherwise, fire and secondary accident risk existence.

After applying input voltage or after removing it, the soft starter will remain warm for a couple of minutes.
Otherwise, body injury or skin burn risk existence.

Do not apply voltage to a damaged or soft starter with parts missing even if the installation is complete.
Otherwise, electric shock hazard existence.

Do not exchange the soft starter input and output power connections.
Otherwise, excessive voltage could be found in the logic control circuit.

SAFETY

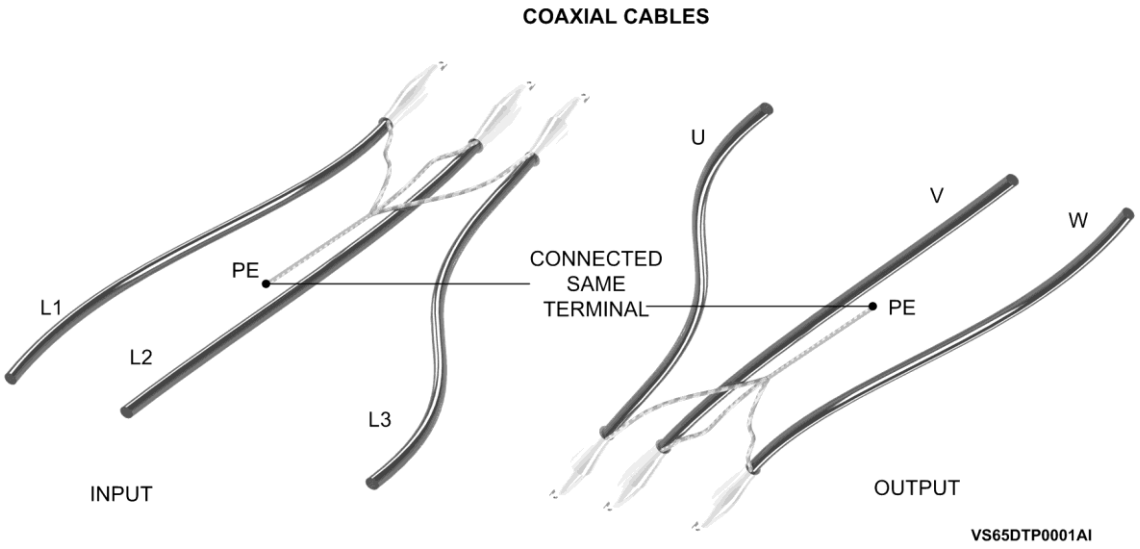
COMMISSIONING

- Before commissioning the soft starter, the user must read carefully this manual and pay particular attention to the connection and start sections.
- Verify all of the parameters and make the necessary settings before starting the equipment. Depending on load and applications, the parameter values can be changed.
- Voltage and current levels applied in terminals as external signs should be in accordance with the manual data. Otherwise, the soft starter could be damaged.

GROUND CONNECTIONS

- Electric shock prevention:

  The soft starter locker chassis must be properly earth ground connected to prevent a possible electric shock even when a leakage current flows through the locker. Disconnect all of the voltage supplies before proceeding with maintenance operations within the soft starter or motor. Due to the existence of capacitors in the power section, the equipment will keep dangerous voltage even when the input voltage is disconnected. Use a cable to earth-ground it and discharge the existing voltage.
- Only connect the earth grounding to the soft starter earth plate. Do not use the case or the chassis screw for grounding.
- The earth protection cable must be connected first and disconnected last.
- The motor earth grounding will be connected to the soft starters' one and not to the installations one.
- The installations earth grounding will be connected to the soft starters' one.
- Equipment input cables are medium voltage cables. As shown in the figure, they are coaxial cables, each one including earth. To carry out with a correct connection it is necessary to join every phase's earth and connect it to the soft starters' earth plate.
- The output cables to the motor have the same characteristics. Their earths should also be joined and connected to the soft starters earth plate IN THE SAME TERMINAL than the input cables.



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WARNINGS

RECEPTION

- The VS65 Series soft starters are handled carefully tested and perfectly packed.
- In the even of transport damage, please ensure that you notify the transport agency and Power Electronics: 902 40 20 70 (International + 34 96 136 65 57).

UNPACKING

- Verify model and serial number of the soft starter is the same on the box, delivery note and unit.
- Each soft starter is supplied with an installation manual.

RECICLYING

- Packing of the equipments should be recycled. Therefore, it is necessary to separate materials included (plastic, paper, cardboard, Wood….) and deposit them on proper recycling banks.
- Waste products of electric and electronic devices should be selectively collected for their correct environmental management.

SAFETY

- Before starting the soft starter, read this manual completely to gain an understanding of the unit. In case of doubt, please contact Power Electronics (902 40 20 70 / +34 96 136 65 57) or your nearest agent.
- Wear safety goggles when operating the soft starter with voltage.
- Handle the equipment in accordance with the soft starters' weight.
- Proceed with the installation according to the instructions found in this manual.
- Do not stack the soft starter or place heavy objects on the soft starter.
- Ensure that the soft starter is correctly installated considering the recommendations within this manual.
- Do not drop the soft starter or to impact exposure.
- The VS65 Series soft starters contain static-sensitive printed circuit boards. Use static safety procedures when handling boards.
- Avoid installing the soft starter in different conditions form those described in the Technical Characteristics section.

1. DISPLAY UNIT AND CONTROL KEYPAD

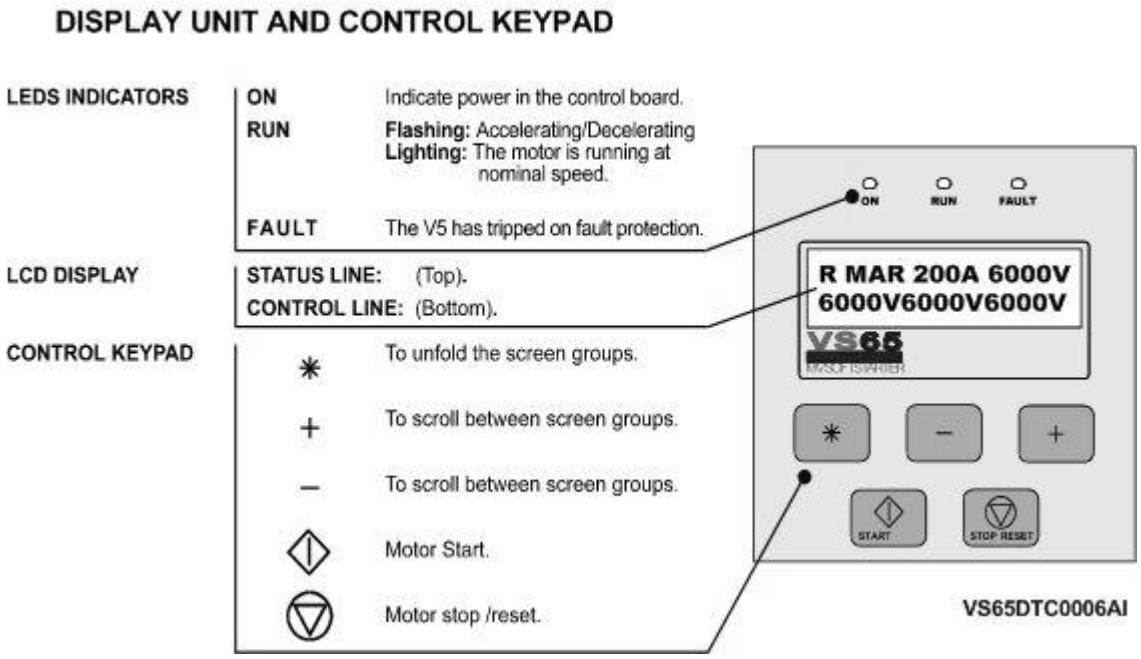

Figure 6.1 Display Unit

1.1. LCD Screen

The soft starters display has a two lined Display screen with sixteen characters per line (16 x2). Each line has different functions.

- **STATUS LINE (Upper):**

  Always present and shows the soft starter status (COMMS/SLOW.S), the phase current and the voltage in the Medium Voltage line.

- **CONTROL LINE (Lower):**

  Set the different soft starter parameters.

1.2. Control Keypad

⊕ and ⊖	To scroll between screen groups.
✳	Press to unfold the screen groups.
⊕ and ⊖	Inside the group, to scroll to reach the parameter.
✳ and ⊕ or ⊖	Press simultaneously to set the screen.
⊖	Used to exit screen groups until the group name is reached.

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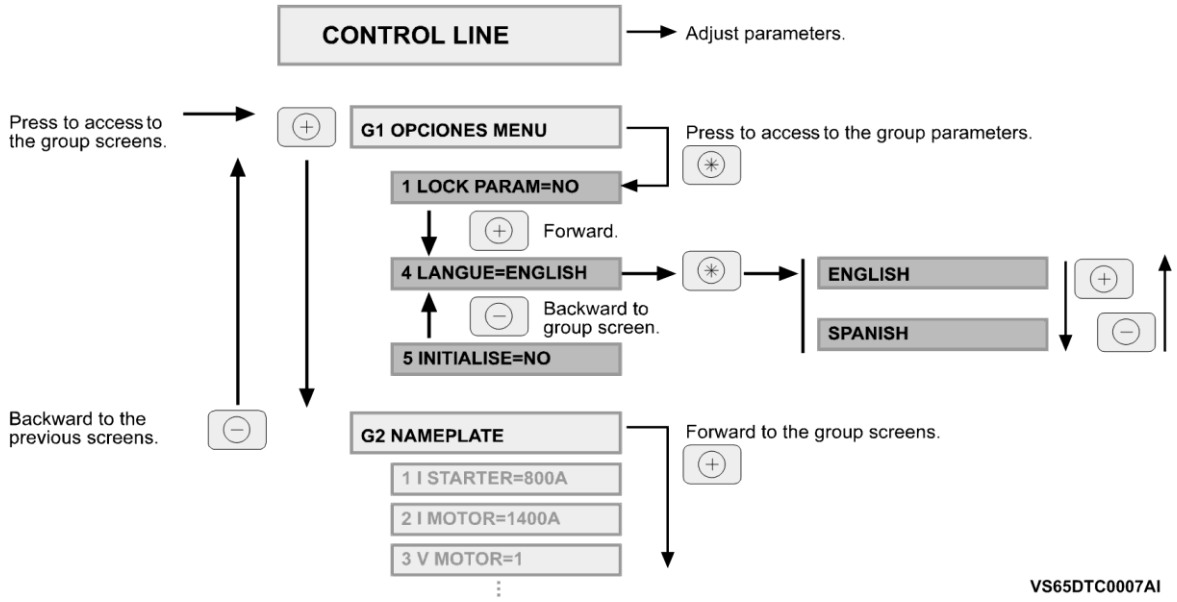


Figure 6.2 Programming example

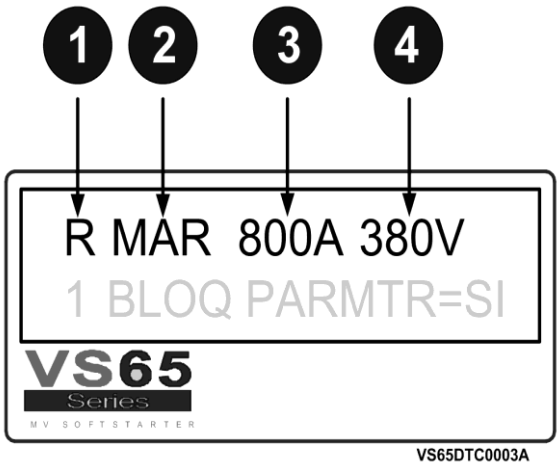
1.3. Start and Stop-Reset Buttons

The VS65 soft starter has two Start, Stop-Reset / Jog Slow Speed buttons available with which the following operations can be carried out:.

Start and Slow Speed.

Soft starter Stop and Rearm and Slow Speed operation.

2. STATUS MESSAGES



1. Indicates the soft starters run order control mode (L) Local, (R) Remote, (C) series Communication, (G) Slow Speed, (P) Pump control.
2. Equipment status. See the status message list. RUN = RUNNING.
3. Motor mean current consumption.
4. VS65 input Medium Voltage.

Figure 7.1 Display Status Messages

Visualisation	Name	Description
RDY	READY	Equipment ready to run.
ITQ	INITIAL TORQUE	The soft starter is applying the initial torque shown in [G4.4] during the specified time given in [G4.5].
ACL	ACCELERATING	Motor accelerating phase.
RUN	RUNNING	The soft starter runs at nominal speed, after completing the accelerating ramp. (Input voltage = Output Voltage).
DEC	DECELERATING	Motor decelerating phase.
HAM	HAMMER	The hammer hit decelerating algorithm is running.
UNV	UNDER VOLTAGE	Under power voltage warning.
OVV	OVER VOLTAGE	Over power voltage warning.
OVL	OVERLOAD	Overload warning.
UDL	UNDERLOAD	Underload warning.
OVT	TEMPERATURE FAULT	Excessive temperature in the soft starter.
SHP	SHEARPIN	Shearpin current.
ASY	ASYMMETRIC CURRENT	Motor asymmetric current.
FLT	FAULT	Fault in soft starter produced.
STD	START DELAY	The soft starter is waiting the time given in the parameter [G4.1]. Start delay.
EXT	EXTERNAL FAULT	Fault status due to an external fault caused by a digital input.
P/T	TORQUE PULSE	The soft starter applies torque pulse configured in the parameter [G4.2] Torque pulse during the time given in parameter [G4.3] Torque pulse time.
ILT	CURRENT LIMIT	The soft starter has reached the maximum current consumption in accordance with the parameter [G4.7] Limit acceleration current.
HIP	OVER PRESSURE	Overpressure warning during the time settled in parameter [G16.4]
LOP	UNDER PRESSURE	Under pressure warning during the time settled in parameters [G16.5] and [G16.6].
NOF	NO FLOW	Cavitations warning during the time settled on screens [G16.7] and [G16.8].
LWA	LOW LEVEL	Water low level warning during the time settled on screen [G16.9].

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3. GENERAL INFORMATION SCREENS

On the display lower line it is possible to visualise the general programming information screens (G1 to G16), which include all the information related to the motor and the equipment.

<table>
<tr><th>Screen</th><th>Description</th><th>Range</th><th>Units</th><th>Attribute</th><th>Function</th></tr>
<tr><td>800A 800A 800A</td><td>L1, L2 and L3 phase current</td><td>0 to 9999</td><td></td><td></td><td>Phase current. Shows the input three phases instantaneous current</td></tr>
<tr><td>6000V6000V6000V</td><td>L1-L2, L2-L3, L1-L3 Line voltage</td><td>0 to 999</td><td>-</td><td>-</td><td>Line voltage. Show the input soft starter voltage between phases</td></tr>
<tr><td rowspan="2">50Hz Cos=0.85</td><td>Supply frequency</td><td>0 to 99Hz</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">Supply frequency / Motor phi cosine. Show the supply frequency and the motor phi cosine.
Note: This screen can only be visualised after the soft starter has completed the start.</td></tr>
<tr><td>Motor Phi cosine</td><td>0 to 1</td></tr>
<tr><td rowspan="2">7200kW Pr=99%</td><td>Power consumption</td><td>1 to 900kW</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">Shows the power consumption and the axis torque.
Note: This screen can be only visualised when the motor is running.</td></tr>
<tr><td>Axis torque</td><td>0 to 999%</td></tr>
<tr><td>RELAYS 0 0 0</td><td>1, 2 and 3 Relay Status</td><td>0 – Open
X – Closed</td><td>-</td><td>-</td><td>Shows the 1, 2 and 3 relay status.</td></tr>
<tr><td>DIG INPUT= 0 0 0 0 0 F</td><td>Digital Inputs status and Motor PTC status</td><td>0 – Open
X – Closed
K – Correct
F – Fault</td><td>-</td><td>-</td><td>The first five digits refer to the digital input and the sixth one to the PTC temperature probe input.
<table>
<tr><th>Input</th><th>Terminal</th><th>Range</th></tr>
<tr><td>Digital Input 1</td><td>T11</td><td rowspan="5">0: Open
X: Closed</td></tr>
<tr><td>Digital Input 2</td><td>T12</td></tr>
<tr><td>Digital Input 3</td><td>T13</td></tr>
<tr><td>Digital Input 4</td><td>T14</td></tr>
<tr><td>Digital Input 5</td><td>T15</td></tr>
<tr><td>Not used</td><td>T16-T17</td><td>K: Correct
F: Fault</td></tr>
</table></td></tr>
<tr><td>O/L STATUS=0%</td><td>Motor Overload status</td><td>0 to 100%</td><td>-</td><td>Read only</td><td>When the motor current is smaller than the overload value introduced on screen [G3.2], the Overload Status is 1%. However, when the current increases over the overload value, the Overload Status factor increases, faster as the difference between values increases. When the Overload Status factor reaches 100%, the soft starter will “trip” due to F4.</td></tr>
<tr><td rowspan="2">AI1=0.00mA = 0%</td><td rowspan="2">Analogue Input 1 status</td><td rowspan="2">0-10V
4-20mA
0-20mA</td><td>V or mA</td><td rowspan="2">Read only</td><td rowspan="2">When shown in mA the user has selected 0 or 1 on the [G6.8] screen. When shown in V, the user has selected option 2 on the [G6.8] screen. The following value will have BAR, ºC, m, % units depending on the selection made on [G6.10] Screen.</td></tr>
<tr><td>User Units</td></tr>
<tr><td rowspan="2">AI2=0.00mA = 0%</td><td rowspan="2">Analogue Input 2 status</td><td rowspan="2">0-10V
4-20mA
0-20mA</td><td>V or mA</td><td rowspan="2">Read Only</td><td rowspan="2">This screen shows the analogue input 2 in V or mA, depending on the configuration chosen on screen [G6.11] and the units the user has configured on screen G6.13 and the scale selected on screen [G6.12].</td></tr>
<tr><td>User Units</td></tr>
<tr><td>AO1=0.00mA =0%</td><td>Analogue Output 1 status</td><td>0-20mA
4-20mA</td><td>mA and %</td><td>Read Only</td><td>Show the output analogue 1 value, in real values and percentage over the analogue output range.</td></tr>
<tr><td>S/W 2.62 H/W 2.1</td><td>Software y Hardware revision</td><td>-</td><td>-</td><td>-</td><td>Shows the soft starter’s Software (S/W) and Hardware (H/W) revision.</td></tr>
</table>

4. PARAMETERS DESCRIPTION

The different VS65 parameters are grouped due to functionality in groups (G1 to G16). To access these screens we will press the [*] key. Once the parameter has been selected, it may have a numeric value or a list of possible functions.

4.1. Group 1 – G1: MENU OPTIONS

Screen & Default Value	Name / Description	Range	Function
1 LOCK PARAM=NO	**G1.1** / Soft starter lock parameters	Yes No	Enables to lock the soft starter parameters. This lockage is effective introducing on screen [G1.2] a password. Activating the parameter lock we would not be able to modify any screen group [G1-G16]. However, we would be able to visualise any group screen.
2 PASSWORD= 0	**G1.2** / Programming mode password.	OFF, 0000 to 9999	Enables the user to introduce a password to prevent non authorised programming parameter modifications. To proceed with the setting, once [**1 LOCK PARAM=YES]** selected, this screen will appear automatically requesting the password: **PASSWORD=XXXX** To unlock the soft starter programming, follow the instructions: Access group [1 LOCK PARAM=YES] and press (+). [2 PASSWORD=XXXX] will appear on screen, where the previous password should be entered.
3 WRONG P/W=XXXX	**G1.3** / Password recovery	000 to 9999	Provides information for the lock password recovery according to the expression: **PASSWORD = (WRONG PW/2)-3**
4 LANGUE=ENGLISH	**G1.4** / Operating language selection	ENGLISH ESPANOL DEUTSCH	Establish display language.
5 INITIALISE=NO	**G1.5** / Initialisation	YES NO	Initialise the VS65 parameter default values.
6 COMMISSION=YES	**G1.6** / Commissioning	YES NO	Screen groups deactivation. **OPTION** / **FUNCTION** YES – Enables parameter setting NO – Disables parameter setting but enables visualisation

4.2. Group 2 – G2: NAMEPLATE

Screen & Default Value	Name / Description	Range	Function
1 I STARTER = InA[*]	**G2.1** / Soft starters rated current	1 to 1600A	Shows the soft starter rated current. It is necessary for the equipment to know this value when calibrating the different protections found in the VS65 device. The soft starters are handled with default settings. To modify the rated current press the [*] button during 5 seconds. Once the letter "I" has changed into "I" the current value can be modified.
2 I MOTOR=XXX[*]A	**G2.2** / Motor plate current	1 to 1600A	States the motor rated current. To set the motor nameplate current, introduce this parameter in accordance with the motor nameplate.

∗ Value that depends on the soft starter rated current

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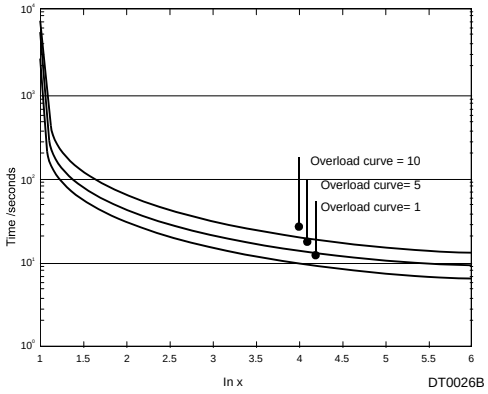
<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>3 V MOTOR=4</td><td>G2.3 / VS65 input line voltage</td><td>1 to 4</td><td>Set the work rated voltage
Depending on the line voltage, there are two versions of this parameter, one for voltages from 2300V to 6000V and another from 6600V to 13800V.

From 2300 to 6000V:
<table><tr><th>OPT.</th><th>DESCRIPTIÓN</th></tr><tr><td>1</td><td>2300V</td></tr><tr><td>2</td><td>3300V</td></tr><tr><td>3</td><td>4160V</td></tr><tr><td>4</td><td>6000V</td></tr></table>From 6600 to 13800V:
<table><tr><th>OPT.</th><th>DESCRIPTIÓN</th></tr><tr><td>1</td><td>6600V</td></tr><tr><td>2</td><td>7200V</td></tr><tr><td>3</td><td>10000V</td></tr><tr><td>4</td><td>13800V</td></tr></table>Introduce this parameter in accordance with the VS65 input line voltage. Make sure the motor plate voltage is within the related voltage range.</td></tr>
<tr><td>4 P MOTOR =XXXkW[*]</td><td>G2.4 / Motor Power Plate</td><td>4 to 999kW</td><td>Set the motor power.</td></tr>
<tr><td>5 COS PHI M =85%</td><td>G2.5 / Motor Phi cosine</td><td>40 to 99%</td><td>Set the Motor Phi cosine.</td></tr>
<tr><td>6 FREQ= 50Hz</td><td>G2.6 / Supply frequency</td><td>50Hz
50/60Hz</td><td>States the motor supply frequency.
Set this parameter to 50Hz where the frequency supply is 50Hz. Within the installations where this value is unknown or 60Hz, set to 50/60Hz.
Note: When 50/60Hz is selected, the soft starter starts an algorithm to detect the line frequency. When 50Hz selected, it remains inactive.</td></tr>
</table>

∗ Value that depends on the soft starter rated current.

4.3. Group 3 – G3: PROTECTIONS

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>1 PHASE SEQUEN=2</td><td>G3.1 / Phase sequence at the soft starter input</td><td>1 to 3</td><td>This parameter establishes which input phase sequence is considered valid. In case a start order is received, the equipment will trig due to F2 WRONG PH/SQ.
<table><tr><th>OPT.</th><th>DESCRIPTION</th></tr><tr><td>1</td><td>NO SEQ PROTEC</td></tr><tr><td>2</td><td>L1 L2 L3 SEQ</td></tr><tr><td>3</td><td>INVERT SEQUE</td></tr></table>To set the soft starter input phase sequences. Set depending on the sequence.
Note: When operating at Slow Speed, or DC-Brake, an operating sequence must be chosen, it is not possible to work WITHOUT A PROTECTION SEQUENCE [1 NO PROTEC SEQ].</td></tr>
<tr><td>2 OV LOAD=InA</td><td>G3.2 / Motor overload current</td><td>(0.6 to 1.5)·In of the VS65</td><td>States the current value at which the equipments overload protections should activate. The trigger time will depend on the exceeding current level set on this screen and the value set on the screen [G3.3]
Before setting, look for the motor plate current reference and introduce the value on screen.
Note: See figure in parameter [G3.3].</td></tr>
</table>

Screen & Default Value	Name / Description	Range	Function
3 OV/LOAD T=5	**G3.3** / Overload curve	1 to 10	The overload curve determines the response time under overload conditions. There is a non-linear relation between the overload parameter [G3 OV LOAD] and this parameter, in order to set the time required for tripping on F4 OVERLOAD. If [3 OV/LOAD T =1] is selected then the response time for an overload condition is almost immediate, but if [OV/LOAD T=10] then takes the soft starter trips on F4 OVERLOAD after a time delay. Setting when a fast response is needed under overload conditions, please select [OV/LOAD T =1]. When a slow response is needed, select [OV/LOAD T =10]. For normal operation leave this value as default [OV/LOAD T =5]. The response time for the overload protection can be calculated from the following curve: 
4 OVL FAC=100%	**G3.4** / Starting Overload Factor	100 to 500%	The parameter function is to increase the overload curve during acceleration. Recommended to start loads with elevated torque momentum. Once the nominal rate is reached, this parameter deactivates and the overload protection will function as it has been explained in [G3.2] and [G3.3]. Adjust the default (100%) value for low inertia applications like pumps, fans (Torque = K x Speed²). Mills, crushers and centrifuges (high inertia moment) will normally require a start with low starting overload factor (150%) and increase this value until the load accelerates without tripping on F4 OVERLOAD. This parameter is set in % [G3.3] Overload Curve.
5 MOTOR PTC=-	**G3.5** / Enable/Disable PTC motor option	-	Not used for this soft starter model.
6 UNLOAD=0.0A	**G3.6** / Under load current	(0 a 0.9)·In of VS65	Underload current determines the current level the motor must not operate below. Leave the adjustment to 50% of the nominal current of the motor. Applications: This protection helps to detect mechanical problems such as broken shafts, belts, when this occurs, the motor will run under no load conditions. When working with pumps, this protection helps to detect no load pump operation, due to a lack of water or pump input pipe water position.
7 UNLOAD T=OFF	**G3.7** / Under load delay	0 to 99s, OFF	This parameter sets the maximum allowable operation time under load conditions before tripping. The setting depends on the application, but should be set to trip as soon as a condition occurs. Applications: Pumps, fans.
8 SHEARPIN=OFF	**G3.8** / Shearpin current	(0.6 to 1.2)·In of VS65, OFF	The soft starter will stop immediately when the current drawn by the motor reaches this value during normal operation. This parameter is off during acceleration or deceleration. The stop should be done in a controlled way. Set the current value to stop the VS65. Application: Oversized electrical motors used for starting, but working under nominal conditions at running, may only reach the Shearpin current because of mechanical problems locked rotors, etc.

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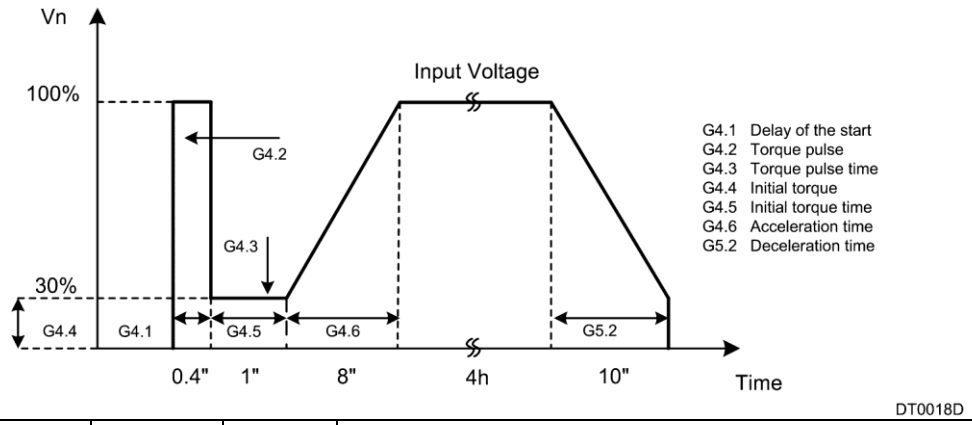
<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>9 ASYM I ENB=Y</td><td>G3.9 / Asymmetrical current</td><td>Y
N</td><td>Enable/Disable the asymmetric current protection at the soft starter
<table>
<tr><th>OPTION</th><th>FUNCTION</th></tr>
<tr><td>Y=YES</td><td>When enabled, the soft starter will trip on F3 ASYM CURR if there is a current imbalance greater than 40%.</td></tr>
<tr><td>N=NO</td><td>Protection disabled.</td></tr>
</table></td></tr>
<tr><td rowspan="4">10 UNDER V=5052V</td><td rowspan="4">G3.10 / Under voltage</td><td>1694 to 2178V @2300V</td><td rowspan="4">To protect the motor or other equipment from low mains voltage. Low voltage will usually increase the motor current.
Set the minimum tolerable level in conjunction with [11 Under voltage Delay].</td></tr>
<tr><td>2431 to 3126V @3300V</td></tr>
<tr><td>3065 to 3941V @4160V</td></tr>
<tr><td>4421 to 5684V @6000V</td></tr>
<tr><td>U/V DELAY=5s</td><td>G3.11 / Under voltage delay</td><td>0 to 10s, OFF</td><td>This parameter sets the maximum operation time for under voltage conditions before tripping.
Set to maximum under voltage operation time allowed</td></tr>
<tr><td rowspan="4">12 OVERVOLT=6947V</td><td rowspan="4">G3.12 / Over voltage</td><td>2421 to 2784V @2300V</td><td rowspan="4">To protect the motor from high input voltage.
Set the maximum level tolerable in conjunction with the [G3.13].</td></tr>
<tr><td>3473 to 3944V @3300V</td></tr>
<tr><td>4378 to 5035V @4160V</td></tr>
<tr><td>6315 to 7263V @6000V</td></tr>
<tr><td>13 O/V DELAY=5s</td><td>G3.13 / Over voltage delay</td><td>0 to 10s, OFF</td><td>This parameter sets the maximum operation time during over voltage conditions before tripping.
Set to maximum over voltage operation time allowed</td></tr>
<tr><td>14 START LIMIT=3</td><td>G3.14 / Maximum number of starts</td><td>1 to 10</td><td>Establish the maximum number of starts allowed before tripping on F12 EXCESIV STR.
Set maximum number of starts allowed for the specified time at [15 START INTERVAL].</td></tr>
<tr><td>15 STR/INT=15Min</td><td>G3.15 / Start interval</td><td>0 to 60Min, OFF</td><td>Establish the time allowed between the first and the last start in [14: START LIMIT] before tripping on F12 EXCESIV STR.
Set the time limit for the maximum number of starts to occur.
<u>Applications:</u> Mills, crushers, and applications where an excessive number of starts could damage the motor due to very high current during acceleration.</td></tr>
</table>

4.4. Group 4 – G4: ACCELERATION

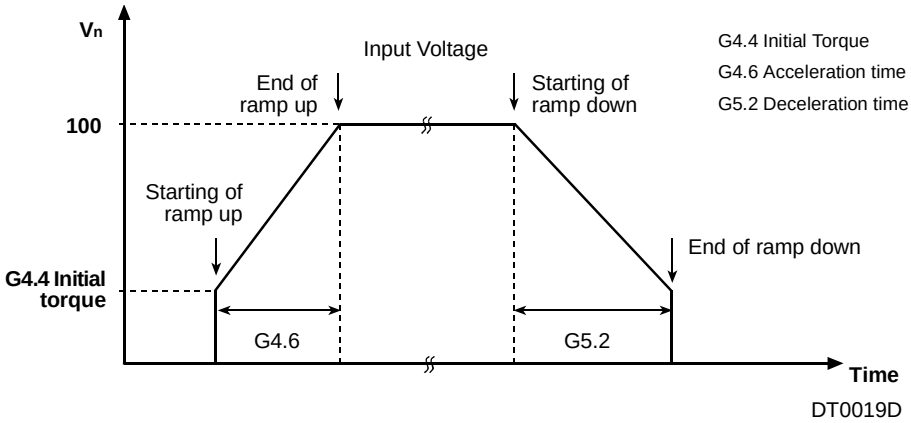
Screen & Default Value	Name / Description	Range	Function
1 STR DELAY=0s	**G4.1** / Starting Delay	0 to 600s	Sets the time the VS65 will wait after a start command has been provided and acceleration will start. Adjust this value in accordance with the application.
2 PULS TORQ =50%	**G4.2** / Torque Pulse	50 to 100%	Choose the torque pulse level applied to the motor for the time specified at [G4.3]. This value's setting must be done in conjunction with [G4.3] to initiate a first move of the motor.
3 PULS TQ T=OFF	**G4.3** / Torque Pulse Time	OFF, 0.1 to 0.9s	Sets the time for the [2 PULS TORQ] to be applied.
INIT TORQ=35%	**G4.4** / Initial Torque	30 to 99%	Establish the initial torque to be applied to the motor at the beginning of the ramp up. When adjusting, it is recommended to begin with a low initial torque value, normally default. Observe motor rotation immediately after start command. If the motor doesn't spin, machine torque requirement may be higher, and it may be necessary to increase this until the motor starts to turn normal after a start command has been applied. If a very high current is noticed at the very beginning of starting process, this could be due to an initial torque setting that is too high - this must be decreased until a proper value is achieved. <u>Applications:</u> For submerged pumps, generally a torque between 40% and 45% is required. For applications such as mills or crushers, the required torque is normally between 40% and 50%. **Note:** These values are typical adjustments. Each application requires individual settings to achieve the best performance.

Screen & Default Value	Name / Description	Range	Function
5 INIT TQ T=1s	**G4.5** / Initial torque time	0 to 10s	Set the time for [3 INITIAL TORQUE] to be applied to the motor. To adjust the parameter when working with high inertia loads, increase the value in conjunction with parameter [4 INITIAL TORQUE], until the motor begins to turn. All other applications should leave this value as default. Applications: In pumps a usual value is 0, and in heavy load machines it can vary between 1 and 3 seconds.
			
6 ACEL TIME=6s	**G4.6** / Acceleration Time	0 to 180s	Adjusts the motor acceleration time from standstill to nominal speed, provided that no current limit occurs as that will cause a longer acceleration time. Set depending on the application, the time set will vary in order to make sure no current limit takes place during acceleration. If this occurs, the acceleration time or acceleration current limit settings will need to be increased Applications: In submerged pumps, the usual acceleration time is between 4 and 8 seconds. With very high inertial loads, that can vary between 20 and 60 seconds. **Note:** These values are typical adjustments. Each application requires individual settings to achieve the best performance
7 I LIMIT=3.5InA[*]	**G4.7** / Current limit	(1.5 to 5)·In of VS65	Maximum current a motor can draw during the acceleration/deceleration. Set the maximum current a motor can draw during the acceleration/deceleration of the motor. Typically set to 2.5 to 3x nominal current of the motor. Values below 2 times of the motor rated current should be avoided. Under these conditions the resulting motor torque is normally insufficient to generate a successful start at full load; also the soft starter could trip on F4 Overload.

∗ Value that depends on the soft starter rated current

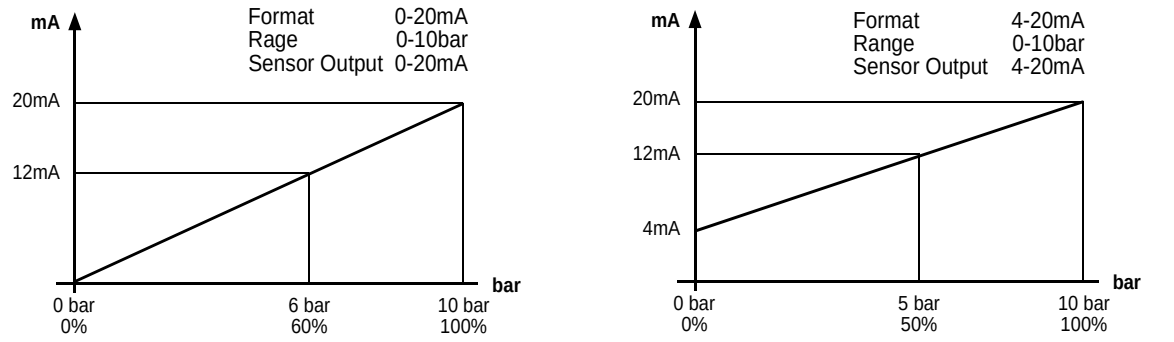
4.5. Group 5 – G5: DECELERATION

Screen & Default Value	Name / Description	Range	Function
1 FREWEL STP=Y	**G5.1** / Freewheel stop	Y N	Set the required stop mode. The stop could be controlled through a ramp down voltage or uncontrolled where the time to stop depends on the inertia of the load **OPTION** / **FUNCTION** Y=YES / Freewheel stop enabled. N=NO / Freewheel stop disabled. To set controlled stop is select [1 FREWELSTOP=No], and [1 FREWELSTOP=Yes] for a spinning stop.
2 DECL TIME=12s	**G5.2** / Deceleration Time	1 to 180s	Establish the required time for a controlled stop. To set this parameter, firstly begin with a short time (10 or 15 seconds) and increase it until desired stop is achieved. If no satisfactorily results are obtained set hammer algorithm in [G5.3].

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>3 DEC MD SEL=1</td><td>G5.3 / Motor Deceleration Algorithm</td><td>1 to 2</td><td>In applications where it is necessary to avoid water hammer effect, select this algorithm. In other applications, the normal deceleration ramp is sufficient.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>1</td><td>NORMAL CURVE.</td></tr>
<tr><td>2</td><td>HAMMER PREVENT.</td></tr>
</table>
When setting applications with water hammer problems during deceleration, select the hammer algorithm. In other applications set normal deceleration algorithm.
When selecting the hammer algorithm for the deceleration, 2 parameters must be set to properly adjust the stop.
For correct adjustment of the deceleration time in applications with hammer problems it may be necessary to perform an interactive process by trial and error until the application is correctly commissioned.</td></tr>
<tr><td>4 HAMR FACT=75%</td><td>G5.4 / Hammer factor</td><td>1 to 99%</td><td>Set the time percentage for the hammer algorithm is to be active during deceleration</td></tr>
<tr><td>5 MINI TORQ=1%</td><td>G5.5 / Minimum torque</td><td>1 to 99%</td><td>The minimum torque to be applied during deceleration (for Hammer Algorithm).</td></tr>
</table>

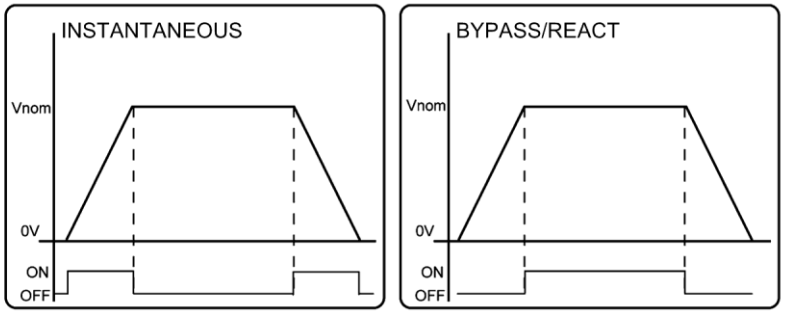
4.6. Group 6 – G6: INPUTS

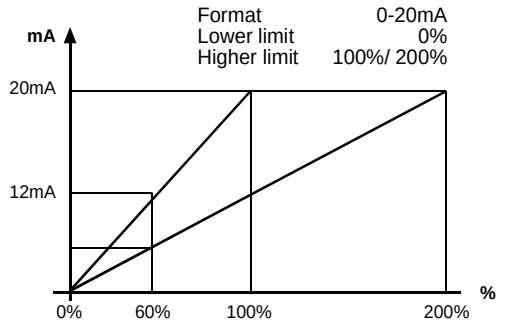
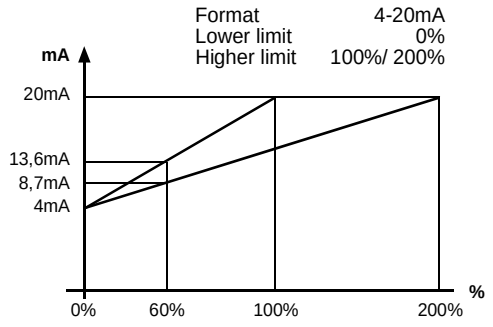
<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>1 OPER MODE=1</td><td>G6.1 / Control mode source</td><td>0 to 5</td><td>Set the control mode of the soft starter
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Disable</td><td>No control source enabled. There is no way to Start/Stop-Reset the VS65.</td></tr>
<tr><td>1</td><td>Local</td><td>Start/Stop-Reset enabled by keypad.</td></tr>
<tr><td>2</td><td>Remote</td><td>Start/Stop-Reset enabled by digital inputs.</td></tr>
<tr><td>3</td><td>Serial Comms</td><td>Start/Stop-Reset enabled by serial comms.</td></tr>
<tr><td>4</td><td>Local Jog V/S</td><td>Not available for this soft starter mode.</td></tr>
</table>
Note: In the case of making equipment reboot, the control mode will be LOCAL as default value. From the Serial Comms option, user can take a look at the parameters but cannot make STARTS, STOPS or RESETS.</td></tr>
<tr><td>2 LOCAL RESET=Y</td><td>G6.2 / Local reset control</td><td>Y
N</td><td>Enable local reset via keypad.</td></tr>
</table>

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>3 DINPUT1 SEL=4</td><td>G6.3 / Multifunction 1 input</td><td>0 to 10</td><td rowspan="6">Select the task of the digital input once it is active (X).
<table>
<tr><th>OPT.</th><th>MODE</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Not active</td><td>The input left without effect.</td></tr>
<tr><td>1</td><td>Start</td><td>Start command given through pushbutton.</td></tr>
<tr><td>2</td><td>Stop</td><td>Stop command given through pushbutton.</td></tr>
<tr><td>3</td><td>Stop-Reset NC</td><td>Stop/Reset command given through pushbutton.</td></tr>
<tr><td>4</td><td>Start-Stop</td><td>Start command when contact is closed and stop command when contact is opened.</td></tr>
<tr><td>5</td><td>Reset NC</td><td>The reset is done when the contact is closed.</td></tr>
<tr><td>6</td><td>Slow Speed +</td><td>Not available.</td></tr>
<tr><td>7</td><td>Slow Speed -</td><td>Not available.</td></tr>
<tr><td>8</td><td>DC Brake</td><td>Not available.</td></tr>
<tr><td>9</td><td>Dual setting</td><td>Selection of the Second Setting at G8.</td></tr>
<tr><td>10</td><td>External trip</td><td>Fault will be generated when the contact is opened.</td></tr>
</table></td></tr>
<tr><td>4 DINPUT2 SEL=0</td><td>G6.4 / Multifunction 2 input</td><td>0 to 10</td></tr>
<tr><td>5 DINPUT3 SEL=0</td><td>G6.5 / Multifunction 3 input</td><td>0 to 10</td></tr>
<tr><td>6 DINPUT4 SEL=0</td><td>G6.6 / Multifunction 4 input</td><td>0 to 10</td></tr>
<tr><td>7 DINPUT5 SEL=0</td><td>G6.7 / Multifunction 5 input</td><td>0 to 10</td></tr>
<tr><td>8 ANI1 FORMAT =1</td><td>G6.8 / Analogue Input 1 Format</td><td>0 to 2</td><td>It configures the AI1 as voltage or current signal.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>0-20mA</td></tr>
<tr><td>1</td><td>4-20mA</td></tr>
<tr><td>2</td><td>0-10V</td></tr>
</table></td></tr>
<tr><td colspan="4"> 

DT0028C</td></tr>
<tr><td>9 AI1 RANGE 0_10</td><td>G6.9 / Analogue Input Range</td><td>0_0 to 0_999</td><td>Set according to the range of the connected transducer in absolute units.</td></tr>
<tr><td>10 AI1 UNITS=OFF</td><td>G6.10 / Analogue Input 1 units</td><td>OFF,
Bar
ºC
Mtr</td><td>When OFF, is displayed in %.</td></tr>
<tr><td>11 ANI2 FORMAT =1</td><td>G6.11 / Analogue Input 2 Format</td><td>0 to 2</td><td>It configures the AI2 as voltage or current signal.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>0-20mA</td></tr>
<tr><td>1</td><td>4-20mA</td></tr>
<tr><td>2</td><td>0-10V</td></tr>
</table></td></tr>
<tr><td>12 AI2 RANGE 0_10</td><td>G6.12 / Analogue Input 2 Range</td><td>0_0 to 0_999</td><td>Set according to the range of the connected transducer.</td></tr>
<tr><td>13 AI2 UNITS=OFF</td><td>G6.13 / Analogue Input 2 units</td><td>OFF,
Bar
ºC
Mtr</td><td>When OFF, is displayed in %.</td></tr>
</table>

4.7. Group 7 – G7: OUTPUTS

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>1 REL1 SEL ON=14</td><td>G7.1 / Relay 1 control source selection</td><td>1 or 14</td><td rowspan="3">
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th><th>FUNCTION</th></tr>
<tr><td>1</td><td>ALWAYS ON</td><td>Relay is enabled.</td></tr>
<tr><td>9</td><td>General Fault</td><td>Relay will be active a fault occurs.</td></tr>
<tr><td>14</td><td>INSTANTANEOUS</td><td>ON at the beginning of the ramp up /
OFF at the end of the ramp down.
Figure [G7.3]</td></tr>
<tr><td>15</td><td>Bypass/React</td><td>ON at the end of the ramp up /
OFF at the beginning of the ramp down.
Figure [G7.3]</td></tr>
</table>
</td></tr>
<tr><td>2 REL2 SEL ON=15</td><td>G7.2 / Relay 2 control source selection</td><td>15</td></tr>
<tr><td>3 REL3 SEL ON=9</td><td>G7.3 / Relay 3 control source selection</td><td>9</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>4 ANALOG1 SEL=0</td><td>G7.4 / Analogue output 1 source selection</td><td>0 to 7</td><td>Provides the ability to select the driving source of the Analogue output, from the following list.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>UNUSED</td></tr>
<tr><td>1</td><td>MOTOR CURRENT</td></tr>
<tr><td>2</td><td>MOTOR POWER</td></tr>
<tr><td>3</td><td>MOTOR TORQUE</td></tr>
<tr><td>4</td><td>COSINUS PHI</td></tr>
<tr><td>5</td><td>INPUT VOLTAGE</td></tr>
<tr><td>6</td><td>ANALOG I 1 ECHO</td></tr>
<tr><td>7</td><td>ANALOG I 2 ECHO</td></tr>
</table>
</td></tr>
<tr><td>5 AO1 FORMAT=0</td><td>G7.5 / Analogue output format</td><td>0 to 1</td><td>Select the electrical format of the Analogue output.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>0</td><td>0-20mA</td></tr>
<tr><td>1</td><td>4-20mA</td></tr>
</table>
Note: To obtain an analogue output of 0-10V, you should configure the analogue output format as 0-20mA and connect a resistor of 500 Ω, ¼ W and 1% between terminals 22 and 23.</td></tr>
</table>

Screen & Default Value	Name / Description	Range	Function
  DT0034B			
6 AO1 LOW=0%	**G7.6** / Analogue Output low set point	0 to 500%	It scales de Analogue Output in order to get a better reading
7 AO1 HIGH=100%	**G7.7** / Analogue Output high set point	0 to 500%	

4.8. Group 8 – G8: DUAL SETTING

Screen & Default Value	Name / Description	Range	Function
1 DUALSETING=N	**G8.1** / Dual Setting	Y N	Enable/Disable a second adjustment for [G4] acceleration, [G5] deceleration and for the overload curve [G3.3]. **OPTION** / **FUNCTION** Y=YES / Dual setting enabled. N=NO / Dual setting disabled. When a second parameter is required set select Dual Setting to Yes. This second adjustment is activated by one of digital inputs. Applications: Mills, crushers and any application that at a certain operation stage requires a harder/softer parameter set.
2 PLS TORQ2=50%	**G8.2** / Dual setting Torque Pulse	50 to 100%	Choose the torque pulse level applied to the motor for the time specified at [G8.3] Set this value in conjunction with G8.3 to initiate a first acceleration of the motor.
3 PLS TQ T2=OFF	**G8.3** / Dual setting Pulse Time.	OFF, 0.1 to 0.9s	Sets the time for the torque pulse [G8.2] to be applied.
4 INIT TRQ2 =30%	**G8.4** / Dual setting Initial Torque	30 to 99%	Establish the initial torque to be applied to the motor at the beginning of the ramp up. When adjusting, refer to parameter [G4.4] for further information.
5 T PAR INI2=1s	**G8.5** / Dual setting Initial Torque Time	0 to 10s	Set the time for the initial torque [G8.4] to be applied to the motor. Proceeding with the adjustment, refer to parameter [G4.5] for further information.
6 ACC TIME2=12s	**G8.6** / Dual setting Acceleration time	0 to 180s	Adjust the motor acceleration time from standstill to nominal speed, provided that no current limit occurs as that will cause a longer acceleration time. The time setting depends on the application. Refer to parameter [G4.6] for further information.
7 I LIMIT2 =3 InA[*]	**G8.7** / Dual Setting current limit	(1.5 to 5)·In of VS65	Maximum current a motor can draw during the acceleration/deceleration. Set to determine the maximum allowed current consumption during the acceleration / deceleration. Refer to parameter [G4.7] for further information.
8 FREWEL STP2=N	**G8.8** / Dual setting Freewheel stop	Y N	Set the required stop mode. The stop could be controlled through a ramp down voltage or uncontrolled where the time to stop depends on the inertia of the load, the freewheel stop. Set N" for a spinning stop, set Y, in case a controlled stop is required. Refer to parameter [G5.1] for further information.

∗ Value that depends on the soft starter rated current

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>9 DEC TIME2=12s</td><td>G8.9 / Dual setting deceleration time</td><td>0 to 180s</td><td>Establish the required time for a controlled stop.
For this parameter adjustment, begin with a short time and increase it until desired stop is achieved. Refer to parameter [G5.2] for further information.</td></tr>
<tr><td>10 DEC MD SEL2= 1</td><td>G8.10 / Dual setting deceleration mode selection</td><td>1 to 2</td><td>In applications where it's desired to avoid water hammer effect, select this algorithm. In other applications, the normal deceleration ramp is sufficient.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>1</td><td>NORMAL</td></tr>
<tr><td>2</td><td>HAMMER PREVENT</td></tr>
</table>
When setting for applications with water hammer problems during deceleration, select the hammer algorithm. In other applications set normal deceleration algorithm.
When selecting the hammer algorithm for the deceleration, 2 parameters must be set to properly adjust the stop.
Percentage of time the hammer algorithm is active during the deceleration time. Minimum torque the motor must deliver during the stop.
To correctly adjust the deceleration of such an application with hammer problems you may need to perform an interactive process by trial and error until the application is correctly commissioned.</td></tr>
<tr><td>11 HAMR FAC2=75%</td><td>G8.11 / Dual setting hammer factor</td><td>1 to 99%</td><td>Set the percentage of time for the hammer algorithm is to be active during deceleration.
It is set in % of the deceleration time of the motor [G8.9].</td></tr>
<tr><td>12 MINI TRQ2=1%</td><td>G8.12 / Dual setting minimum torque</td><td>1 to 99%</td><td>Set the minimum torque to be applied during deceleration (for Hammer Algorithm).</td></tr>
<tr><td>13 PHASE SEQ2=2</td><td>G8.13 / Dual setting in phase sequence at the input of the soft starter</td><td>1 to 3</td><td>This parameter sets the correct phase sequence at the input, when starting the motor. It can happen that the soft starter tries to start with a phase sequence at the input different than the one we have set. In this case the soft starter trips on F2 WRONG PH/SQ.
<table>
<tr><th>OPT.</th><th>DESCRIPTION</th></tr>
<tr><td>1</td><td>NO SEQ PROTECT</td></tr>
<tr><td>2</td><td>L1 L2 L3 SEQ</td></tr>
<tr><td>3</td><td>2 L1 L2 L3 seq</td></tr>
</table>
Before adjusting, determine your input phase sequence. Then set this parameter according to this sequence.
Note: When operating at SLOW SPEED or DC BRAKE you must always select a phase sequence (L1 L2 L3 or Inverse Sequence). The option
[1 NO SEQ PROTECT] is not allowed for these modes.</td></tr>
<tr><td>14 OV LOAD2=InA[*]</td><td>G8.14 / Dual setting overload motor current</td><td>(0.6 to 1.5)·In of VS65</td><td>Determines the current value in which the equipments overload protections will activate. For more details consult the parameter [3.2]
In order to proceed with the adjustment, check the nameplate current and introduce the value on screen.</td></tr>
<tr><td>15 OV/LOAD T2=5</td><td>G8.15 / Dual setting of overload curve</td><td>1 to 10</td><td>This parameter sets the overload motor current protection at nominal conditions. For more details, please consult parameter [G3.3].
Set [15 OV/LOAD T =1] in case you need a fast response under overload conditions. However, if you need a slow response, then select [OV/LOAD T =10]. For normal operation adjust to its default setting [OV/LOAD T =5].</td></tr>
<tr><td>16 OVL FAC2=100%</td><td>G8.16 / Dual setting starting Overload Factor</td><td>100 to 500%</td><td>This parameter adjusts the overload curve during acceleration. Use this parameter when trying to accelerate high inertia load. In case of pumps, fans (Torque = K x Speed²) leave as default (100%).
This parameter is only active during acceleration and not in normal running conditions, where only [G3.2] and [G3.3] are active.
For low inertia pumps, fans (Torque = K x Speed²) leave as default value (100%).
For mills, crushes and centrifuges (high inertia moment) start with low starting overload factor (150%) and increase this value till we can accelerate this load without tripping on F4 OVERLOAD.</td></tr>
<tr><td>17 MTR PTC2=N</td><td>G8.17 / Dual setting PTC motor option</td><td>Y
N</td><td>Enables /Disables the Motor PTC option in dual setting.
Motor warming detection through a PTC thermistor. For further information consult [G3.5] parameter.</td></tr>
<tr><td>18 UNLOAD2=0.0A</td><td>G8.18 / Dual setting of under load current</td><td>(0 to 0.9)·In of VS65</td><td>Under load current determines the current level the motor must not operate below.
Usually adjust to 50% of the nominal current of the motor.
Application: This protection detects mechanical problems, such as broken shafts, belts. When this occurs, the motor will run under no load conditions.
When working with pumps, this protection help to detect no load pump operation, due to a lack of water or pump input pipe water position.</td></tr>
<tr><td>19 UNLOAD T2=OFF</td><td>G8.19 / Dual setting of under load delay</td><td>0 to 99s, OFF</td><td>This parameter sets the maximum allowable operation time under load conditions before tripping.
Set depending on the application, but should be set to trip as soon as a condition occurs.
Applications: Pumps, fans.</td></tr>
</table>

∗ Value that depends on the soft starter rated current

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>20 SHRPIN2=OFF</td><td>G8.20 / Dual setting Shearpin current</td><td>(0.6 to 1.2)·In of VS65, OFF</td><td>The soft starter should stop immediately when the current drawn by the motor reaches this value during nominal conditions. This parameter is off during acceleration or deceleration. The stop should be done in a controlled way.
Set current value for the VS65 to stop.
<u>Application:</u> Oversized electrical motors used for starting, but working under nominal conditions at running, it may only reach the Shearpin current due to mechanical problems like locked rotors, etc.</td></tr>
<tr><td>21 ASYM I ENB2=N</td><td>G8.21 / Dual setting asymmetrical current</td><td>Y
N</td><td>Enable/Disable the asymmetric current protection at the soft starter. When enabled, the soft starter will trip on F3 ASYMMETRIC CURRENT if there is a current imbalance greater than 40%.</td></tr>
<tr><td>22 I MTR2=xxxxA</td><td>G8.22 / Dual setting motor rated current</td><td>1 to 1200A</td><td>Set the nominal current of the motor. This is necessary for correct motor protection.
Set this value according to rated (nameplate) motor current.</td></tr>
<tr><td>23 V MTR2=2</td><td>G8.23 / Dual Setting rated Motor Voltage</td><td>1 to 4</td><td>Set the work rated voltage
Depending on the line voltage, there are two versions of this parameter, one for voltages from 2300V to 6000V and another from 6600V to 13800V.

From 2300 to 6000V:
<table>
<tr><th>OPT.</th><th>DESCRIPTIÓN</th></tr>
<tr><td>1</td><td>2300V</td></tr>
<tr><td>2</td><td>3300V</td></tr>
<tr><td>3</td><td>4160V</td></tr>
<tr><td>4</td><td>6000V</td></tr>
</table>
From 6600 to 13800V:
<table>
<tr><th>OPT.</th><th>DESCRIPTIÓN</th></tr>
<tr><td>1</td><td>6600V</td></tr>
<tr><td>2</td><td>7200V</td></tr>
<tr><td>3</td><td>10000V</td></tr>
<tr><td>4</td><td>13800V</td></tr>
</table>
Introduce this parameter in accordance with the VS65 input line voltage. Make sure the motor plate voltage is within the related voltage range.</td></tr>
<tr><td>24 P MTR 2 =40kW</td><td>G8.24 / Dual setting motor rated power</td><td>40 to 9990kW</td><td>Set the nominal motor power rating.</td></tr>
<tr><td>25 COS PHI 2 =85%</td><td>G8.25 / Dual setting motor power factor</td><td>40 to 99%</td><td>Set the rated (nameplate) motor cos phi to for calculating the instantaneous torque developed by the motor.</td></tr>
<tr><td>26 FREQ 2= 50Hz</td><td>G8.26 / Dual setting supply frequency</td><td>50Hz
50/60Hz</td><td>Set the mains frequency.
Set as default setting, where the mains frequency is 50Hz. Where the mains frequency is unknown or different than 50Hz (60Hz) set 50/60Hz.
Note: When you set 50/60Hz the VS65 starts an algorithm to detect the mains frequency. This algorithm is off when setting 50Hz.</td></tr>
</table>

4.9. Group 10 – G10: FAULT HISTORY

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>1 NO FAULT</td><td>G10.1 / Register 1 of fault history</td><td></td><td rowspan="5">The last fault will be displayed as following table indicates by pressing the “[*] key.

Function: Shows the last fault the soft starter tripped on. When a fault occurs, the soft starter automatically shows this screen. At the same time, the fault led lights up. This fault may be reset by pressing the STOP-RESET button on the display unit (if enabled) or using an externally configured RESET input.

Example: When fault occurs led red will light and status line (upper line) will show FLT. The average current and voltage displayed are the values right when fault occurred.

Last line will show the fault name and the status of VS65 when the fault occurred separated by “/” in case automatic reset was no activated, or by “:” in case it was activated

If “*” key is pressed it will display the position of the fault in the history and the number related to it.

Note: Coming from previous page.

Next, the faults are listed:

<table>
<tr><th>COD</th><th>FAULT</th><th>COD</th><th>FAULT</th></tr>
<tr><td>F0</td><td>NO FAULT</td><td>F14</td><td>SCR1 FAULT</td></tr>
<tr><td>F1</td><td>PHA MISING</td><td>F15</td><td>SCR2 FAULT</td></tr>
<tr><td>F2</td><td>WRONG PH/SQ</td><td>F16</td><td>SCR3 FAULT</td></tr>
<tr><td>F3</td><td>ASYM CURR</td><td>F17</td><td>SCR_S FLT</td></tr>
<tr><td>F4</td><td>OVER LOAD</td><td>F18</td><td>EXCES T LS</td></tr>
<tr><td>F5</td><td>UNDER LOAD</td><td>F19</td><td>LS DISABLE</td></tr>
<tr><td>F6</td><td>PEAK CURR</td><td>F20</td><td>COMS T/OUT</td></tr>
<tr><td>F7</td><td>STARTER OT</td><td>F21</td><td>EXTRN TRIP</td></tr>
<tr><td>F8</td><td>MOTOR PTC</td><td>F22</td><td>CUR FLT</td></tr>
<tr><td>F9</td><td>SHEAR PIN</td><td>F23</td><td>CUR FLT2</td></tr>
<tr><td>F10</td><td>OVER VOLT</td><td>F24</td><td>HIGH PRESSURE</td></tr>
<tr><td>F11</td><td>UNDER VOLT</td><td>F25</td><td>LOW PRESSURE</td></tr>
<tr><td>F12</td><td>EXCESIV STR</td><td>F26</td><td>FLOW SWITCH</td></tr>
<tr><td>F13</td><td>MEMORY FLT</td><td>F27</td><td>DEEP WELL PROBE</td></tr>
</table>
</td></tr>
<tr><td>2 NO FAULT</td><td>G10.2 / Register 2 of fault history</td><td></td></tr>
<tr><td>3 NO FAULT</td><td>G10.3 / Register 3 of fault history</td><td></td></tr>
<tr><td>4 NO FAULT</td><td>G10.4 / Register 4 of fault history</td><td></td></tr>
<tr><td>5 NO FAULT</td><td>G10.5 / Register 5 of fault history</td><td></td></tr>
<tr><td>6 DELET FAULTS=N</td><td>G10.6 / Clear fault history</td><td>Y
N</td><td>Clear the fault history log which resets the above screens back to the default setting NO FAULTS.
In order to adjust the parameter, select YES (Y) to clear the fault history log. The screen will automatically reset back to the default value NO (N) once the fault history is cleared.</td></tr>
</table>

4.10. Group 11 – G11: STATISTICS

Screen & Default Value	Name / Description	Range	Function
1 STARTS1 00000	**G11.1** / Total number of starts	-	Shows the total number of the VS65 starts. This record cannot be reset to zero.
2 STARTS2 00000	**G11.2** / Counter of starts 2	-	Shows the number of the VS65 starts made after [G11.3] has been cleared. This parameter can be reset to zero.
3 DEL STARTS2=NO	**G11.3 /** Delete Start registers	-	It resets to 0 the number of starts displayed in [G11.2].
4 H1 =00000h:00m	**G11.4 /** Total Time Running	-	Shows the total soft starter operation hours. This record cannot be reset to zero.
5 H2= 00000h:00m	**G11.5** / Total of working hours	-	Shows the total soft starter operation hours. This record cannot be reset to zero.
6 DEL HOURS2=NO	**G11.6** / Working hours counter 2	-	Shows the number of the VS65 operations hours made [G11.6] has been cleared.
7 TOTAL FLT=00	**G11.7** / Total number of faults counter	-	Shows the total number where the V5 has tripped due to faults.
8 FAULT 2=0	**G11.8** / Faults counter 2	-	Shows the number of faults occurred after [G11.9] has been cleared. This parameter cannot be reset to zero

Screen & Default Value	Name / Description	Range	Function
9 DEL FAULT2=NO	**G11.9** / Clear faults counter 2	-	Resets to 0 the number of faults displayed in [G11.8]
10 KWH=000000	**G11.10** / Total number of KWH	-	Shows the total value of KWH done by the VS65. This parameter cannot be reset to zero.

4.11. Group 14 – G14: SERIAL COMMUNICATION

Screen & Default Value	Name / Description	Range	Function
1 COM TIME O=OFF	**G14.1** / Serial Communication Timeout	OFF, 0 to 25s	Timeout condition for serial communication. When the time without communication exceeds this parameter the soft starter will trip by F20 Communication Time out. This setting is used to detect the loss of this communication between master and slave. The VS65 stops the motor until the communication is re-established and reset. In certain cases continuous communication is necessary.
2 COM ADRESS=10	**G14.2** / Modbus Device Address	0 to 240	It sets the Modbus address for the equipment into a network.
3 BAUD RATE=9600	**G14.3** / Modbus Communication Baud Rate	OFF 1200 2400 4800 9600	Set the baud rate for Serial Communication.
4 EVEN PARITY=N	**G14.4** / Modbus communication parity	Y N	Selects the parity fro serial communication. **OPTION** / **FUNCTION** Y=YES – Even parity enabled. N=NO – No parity. Parity setting of the soft starter should match with the parity of the bus master into the network.

4.12. Group 15 – G15: AUTO RESET

This group enables VS65 to be automatically reset. Once reset is done, the VS65 will start again in case the fault occurred during start command, acceleration and run. If the fault occurred in ready status “RDY” it will auto reset and comes back to “RDY” again.

Screen & Default Value	Name / Description	Range	Function
1 AUTO RESET=NO	**G15.1** / Automatic Reset	YES NO	Enable / Disable VS65 automatic reset function.
2 ATTEMP NUMBR=5	**G15.2** / Number auto reset attempts before tripping	1 to 5	Provides the number of attempts to reset the VS65 before it trips.
3 R STR DEL=5s	**G15.3** / Delay time from fault event to auto reset	5 to 120s	Allows the user to select the period of time between the fault trip and the auto reset.
4 RS COUNT=15Min	**G15.4** / Time after the attempt counter will be reset	1 to 60Min	Enables the selection of time that the VS65 has to run without fault and after this the internal attempt counter will be reset.

ENGLISH

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>5 F1 AUTO RST=0</td><td>G15.5 / Auto reset fault 1 selection</td><td>0 to 20</td><td rowspan="4">It selects fault no1 for the auto reset mode.

<table>
<tr><th>FAULT</th><th>FAULT LIST</th><th>FAULT</th><th>FAULT LIST</th></tr>
<tr><td>0</td><td>NO AUTO RESET</td><td>11</td><td>SCR_1 FAULT</td></tr>
<tr><td>1</td><td>PHAS MISING</td><td>12</td><td>SCR_2 FAULT</td></tr>
<tr><td>2</td><td>WRONG PH/SQ</td><td>13</td><td>SCR_3 FAULT</td></tr>
<tr><td>3</td><td>ASYM CURR</td><td>14</td><td>SCR_S FLT</td></tr>
<tr><td>4</td><td>OVER LOAD</td><td>15</td><td>EXCESIV LS T</td></tr>
<tr><td>5</td><td>UNDER LOAD</td><td>16</td><td>COMMS T/OUT</td></tr>
<tr><td>6</td><td>STARTER OVT</td><td>17</td><td>EXTERN TRIP</td></tr>
<tr><td>7</td><td>MOTOR PTC</td><td>18</td><td>CUR FLT</td></tr>
<tr><td>8</td><td>SHEAR PIN</td><td>19</td><td>CUR2 FLT</td></tr>
<tr><td>9</td><td>OVER VOLT</td><td>20</td><td>ALL THE FLTS</td></tr>
<tr><td>10</td><td>UNDER VOLT</td><td></td><td></td></tr>
</table>
Note: Option 20 will automatically reset any of the above table faults.</td></tr>
<tr><td>6 F2 AUTO RST=0</td><td>G15.6 / Auto reset fault 2 selection</td><td>0 to 20</td></tr>
<tr><td>7 F3 AUTO RST=0</td><td>G15.7 / Auto reset fault 3 selection</td><td>0 to 20</td></tr>
<tr><td>8 F4 AUTO RST=0</td><td>G15.8 / Auto reset fault 4 selection</td><td>0 to 20</td></tr>
</table>

4.13. Group 16 – G16: PUMP CONTROL

<table>
<tr><th>Screen & Default Value</th><th>Name / Description</th><th>Range</th><th>Function</th></tr>
<tr><td>1 SET IT=LOW</td><td>G16.1 / Irrigation time adjustment</td><td>0.0 to 60.0H, LOW</td><td>Sets the time for the system to be irrigating.
VS65 irrigation timer can be reset [G16.2] (back to 0Hrs.) by decreasing [G16.1] to the same value than [G16.2].</td></tr>
<tr><td>2 I TIME=000Hrs</td><td>G16.2 / Irrigation time display</td><td>0.0 to 60.0H, LOW</td><td>Displays the time the system has been irrigating.
Note: Read only screen.</td></tr>
<tr><td>3 START MODE = 0</td><td>G16.3 / Start mode selection</td><td>0-1</td><td>Selects the start mode of the system.

<table>
<tr><th>OPTION</th><th>FUNCTION</th></tr>
<tr><td>0</td><td>Display unit: Enables the display unit for start stop control of the VS65. This is the only way in which the VS65 can be started or stopped. Digital inputs are preconfigured as follows:

Note: only used for the low voltage trial.</td></tr>
<tr><td>1</td><td>Wire: (Face Plate stop button is Reset only). Remaining digital inputs are preconfigured as follows:

D INPUT 1 High Pressure switch connection (normally closed).
D INPUT 2 Low pressure switch connection (normally closed).
D INPUT 3 Flow switches connection (normally closed).
D INPUT 4 Deep well probe connection (normally closed).
D INPUT 5 is configured for remote two wire start/stop. This input acts as a reset command on closing edge.</td></tr>
</table></td></tr>
<tr><td>4 HI PR DEL=00s</td><td>G16.4 / High pressure timeout</td><td>0 to 60</td><td>This is the time delay before the VS65 trips once the high pressure switch connection opens the D INPUT 1.
Note: VS65 ramps down to stop.</td></tr>
<tr><td>5 L PR DEL=20s</td><td>G16.5 / Low pressure timeout</td><td>0 to 3600s</td><td>This is the time delay before the VS65 trips once the low pressure switch connection opens the D INPUT 2.
Note: VS65 ramps down to stop.</td></tr>
<tr><td>6 L PR BYP=10s</td><td>G16.6 / Low pressure start bypass time</td><td>0 to 1800s (30 min)</td><td>Sets the start bypass time, during which the VS65 starter ignores the Low Pressure input on D INPUT 2.</td></tr>
<tr><td>7 FLO BYP=10s</td><td>G16.7 / No Flow Start Bypass time</td><td>0 to 1800s</td><td>Sets the time period for which the flow switch input is ignored following a start command on D INPUT 3).</td></tr>
<tr><td>8 FLO DEB=10s</td><td>G16.8 / No Flow Debounce Delay</td><td>0 to 60s</td><td>Sets the delay period before the starter responds to a no flow signal when in normal run operation. (D INPUT 3).
Note VS65 ramps down to stop.</td></tr>
<tr><td>9 LO WTR DEL=10s</td><td>G16.9 / Deep Well Probe Delay</td><td>0 to 60s</td><td>Sets the delay period before the starter stops after receiving a valid deep well probe signal. (D INPUT 4).
Note: VS65 freewheel stop ramps.</td></tr>
</table>

5. MODBUS COMMUNICATION

5.1. Modbus Protocol

This section explains how to control several VS65 soft starters by using the Modbus communication.

The Modbus Communication series aim is to introduce itself in to a compatible network with the Modbus communications protocol. This is achieved by the use of RS485 communications. The Series Communications Module enables the soft starter to be controlled and /or monitored as slave by a Modbus master from a remote location.

The RS485 network admits the connection of up to 240 equipments within the same network.

The VS65 soft starter operates as a peripherical slave when it is connected to a Modbus system. This means that the soft starter does not start the communication task. However, the master will be the one who starts the task.

Approximately all of the operating modes, parameters and soft starter characteristics are accessible through the communications series. For instance, master may give the start and stop orders, control the soft starter status, read the motor current consumption….Conclusively, operate with every single soft starter option.

The communication series module uses the standard RS485 for the physic level and the industrial Modbus communication for information exchange.

5.2. Modbus Series Communication Installation Ref: E0004 VS65 Series

The communication series module has been inserted in the lower part of the control board, over 2 female connectors with the following dimensions: 1x5 (lower connector) and 2x7 (upper connector).

Note: The series communication module needs an independent power supply, which has been provided by the J1B connector. The supply voltage must be 9Vef@50Hz.

5.3. Supported Modbus Function Codes

The series communication protocol implemented in he Vs65 soft starter adheres itself completely to the standard industrial communication protocol Modbus from Modicon. Of al existing functions in Modbus protocol, the soft starter uses read-write functions. These functions are the following:

FUNCTION	DESCRIPTION	REGISTERS NUMBER
3	READING REGISTERS	10*
16	WRITING REGISTERS	10*

This function implementation code in the soft starter allows the user to read up to 10 registers of the same Parameter Group within the same frame. In case access to consecutive memory registers is needed, belonging to different groups, they must be done by using as many frames as groups involved.

5.3.1. Modbus Function Code nº3. Registers reading.

This function code enables the Modbus controller (master) t read the data content registers shown in the soft starter (slave). This function code allows only unicast addressing and it is not possible to either broadcast or groupcast addressing.

This function code implementation enables the reading of up to 5 soft starter registers within the same frame.

The following example frame shows how the master tries t read the content of 3 registers, which show the current consumption per phase. The information attached in the question frame is the following:

- Slave data access.
- Modbus function code (3 reading registers).
- Starting data address.
- Nº registers read.
- CRC- 16 code.

Soft starter (slave) response should contain the following fields:

- Slave data access.
- Modbus function code (3 reading registers).
- Nº of bytes to be read.
- Nº bytes / 2 registers
- CRC- 16 code.

Each register is composed of 2 bytes (2 x 8 bits = 16 bits). This is the standard length for all of the soft starter registers.

Function Code nº3 operating example (Reading Registers).

In case reading the equipment current value is needed (nameplate) through communications. This data corresponds to parameter [G2.1]. The frame transmitted is shown below:

Modbus Address	Modbus function code	Starting data address (40022)	Registers number	CRC-16
OAH	03H	00H 15H	00H 01H	94 B5

Assuming the equipments current value is 110A. The Slave response would be:

Modbus Address	Modbus function code	Bytes number	Data	CRC-16
OAH	03H	02H	6EH	9CH 69H

5.3.2. Modbus Function Code nº 16.Writing Registers.

This function codes allows the Modbus controller (master) to write the data registers content given by the soft starter (slave); excepting “Only Read” registers. Notice that the register writing carried out by the master does not stop further modifications done by the slave.

The soft starter function code implementation enables the writing of up to 5 registers within the same frame.

The following example shows how to write the equipment current. The list below shows information which must be included:

- Slave data access.
- Modbus function code (16 writing registers).
- Starting data address.
- Nº of registers to write.
- Nº of bytes to write
- Register content to write
- CRC- 16 code.
- Slave response contents:
- Slave data address.
- Modbus function code (16 writing registers).
- Starting data address.
- Nº of written registers.
- CRC-16 code.

Working Example function code nº 16 (Register writing).

Whenever the user wishes to write the equipment current (nameplate) through communications, value found in [G2] parameter group assigning a value of 100A. The frame to transmit should be:

Modbus Slave Address	Modbus function code	Initial Data Address (40022)	Number of Registers	Number of Bytes	Value (= 100)	CRC-16
0AH	10H	00H 15H	00H 01H	02H	00H 64H	D6H 4EH

The slave response will be:

Modbus Slave Address	Modbus function code	Initial Data Address (40022)	Number of Registers	CRC-16
0AH	10H	00H 15H	00H 01H	11H 76H

5.3.3. General Information Screens

Parameter	Screen	Description	Address	Range	Modbus Range
G0.1 L1	**800A 800A 800A**	Phase Current L1	40185	0-9999	-
G0.1 L2	**800A 800A 800A**	Phase Current L2	40186	0-9999	-
G0.1 L3	**800A 800A 800A**	Phase Current L3	40187	0-9999	-
G0.2V12	**6000V 6000V 6000V**	Line Voltage L12	-40188	0-999	-
G0.2V23	**6000V 6000V 6000V**	Line Voltage L23	-40189	0-999	-
G0.2V13	**6000V 6000V 6000V**	Line Voltage L13	-40190	0-999	-
G0.3	**50Hz Cos=0.85**	Line Frequency	-40191	0-1	-
G0.4	**450kW Pr=99%**	Motor Torque	-40193	0-999	-
G0.4	**450kW Pr=99%**	Motor Power	40194	0-999	-
G0.5	**RELE= 0 0 0**	Relay Status	-40195	No	-
G.06	**EDG= 0 0 0 0 0 F**	Digital Input Status	40196	No	-
G.07	**ESTADO SOB=0%**	Motor Overload	40197	0-100% 100% Overload Condition	-
	EA1=0.00mA = 0%	Analogue Input 1 Status		0-10V 4-20mA 0-20mA	-
	EA2=0.00mA = 0%	Analogue Input 2 Status	V ó mA	0-10V 4-20mA 0-20mA	-
	SA1=0.00mA = 0%	Analogue Output 1 Status		0-20mA 4-20mA	-
	S/W 2.1 H/W 0.2	Hardware and Software Revision	-	-	-

5.3.4. Programming Parameters

Parameter	Screen	Description	Address	Range	Modbus Range
G1.1	**1 LOCK PARAM=NO**	Soft starter parameters lock		Yes No	-
G1.2	**2 PASSWORD= 0**	Programming Password mode	-	OFF, 0000 to 9999	-
G1.2b	**3 WRONG P/W=XXXX**	Password Recovery	-	0000 a 9999	-
G1.6	**6 COMMISSION=YES**	Commissioning	40019	Yes No	0-1
G2.1	**1 I STARTER =xxxA**	Soft starters Rated Current	40022	7A 17A 30A 45A ... 1600A	1-1600
G2.2	**2 I MOTOR=XXX[*]A**	Motor Plate Current	40023	1 to 1600	1-1600
G2.3	**3 V MOTOR=2**	Input Line Voltage	40024	1 to 4	1-4
G2.4	**4 P MOTOR =450kW**	Motor Power Plate	40025	4 to 999kW	40-9990
G2.5	**5. COS PHI M =85%**	Motor Phi Cosine	40026	40 to 99%	40-99
G2.6	**6 FREQ= 50Hz**	Supply Frequency	40027	50Hz 50/60Hz	0-1
G3.1	**1 PHASE SEQUEN=2**	Phase Sequence at the Soft starters Input	40029	1 to 3	1-3
G3.2	**2 OV LOAD=InA**	Motor Overload Current	40030	(0.6 to 1.5)·In of the VS65	120-300
G3.3	**3 OV/LOAD T=5**	Overload Curve	40031	1 to 10	1-10
G3.4	**4 OVL FAC=100%**	Starting Overload Factor	40032	100 to 500%	100-500
G3.6	**6 UNLOAD=0.0A**	Underload Current	40034	(0 to 0.9)·In of VS65	0-180
G3.7	**7 UNLOAD T=OFF**	Underload Delay	40035	0 to 99s, OFF	0-100
G3.8	**8 SHEARPIN=OFF**	Shearpin Current	40036	(0.6 to 1.2)·In of the VS65, OFF	120-240
G3.9	**9 ASYM I ENB=Y**	Asymmetrical Protection	40037	Y N	0-1
G3.10	**10 UNDER V=5052V**	Under Voltage	40038		
G3.11	**UNDERVOLTAGE DELAY**	Under voltage Delay	40039	0 to 10s, OFF	0-11
G3.12	**12 OVERVOLT=6947V**	Over voltage	40040		400-460
G3.13	**13 O/V DELAY=5s**	Over voltage Delay	40041	0 to 10s, OFF	0-11

Parameter	Screen	Description	Address	Range	Modbus Range
G3.14	**14 START LIMIT=3**	Maximum Number of Starts	40042	1 to 10	1-10
G3.15	**15 STR/INT=15Min**	Start interval	40043	0 to 60Min, OFF	1-61
G4.1	**1 STR DELAY=0s**	Starting Delay	40045	0 to 600s	0-600
G4.2	**2 PULS TORQ =50%**	Torque Pulse	40046	50 to 100%	50-100
G4.3	**3 PULS TQ T=OFF**	Torque Pulse Time	40047	OFF, 0.1 to 0.9s	0-9
G4.4	**INIT TORQ=35%**	Initial Torque	40048	30 to 99%	35-99
G4.5	**5 INIT TQ T=1s**	Initial Torque Time	40049	0 to 10s	0-10
G4.6	**6 ACEL TIME=6s**	Acceleration Time	40050	0 to 180s	1-180
G4.7	**7 I LIMIT=1400A**	Current Limit	40051	(1.5 to 5)·In of VS65	300-1000
G5.1	**1 FREWEL STP=Y**	Freewheel Stop	40053	Y N	0-1
G5.2	**2 DECL TIME=12s**	Deceleration Time	40054	1 to 180s	1-180
G5.3	**3 DEC MD SEL=1**	Motor Deceleration Algorithm	40055	1 to 2	1-2
G5.4	**4 HAMR FACT=75%**	Hammer Factor	40056	1 to 99%	-
G5.5	**5 MINI TORQ=1%**	Minimum Torque	40057	1 to 99%	-
G6.1	**1 OPER MODE=1**	Control Mode Source	40059	0 to 5	0-5
G6.2	**2 LOCAL RESET=Y**	Local Reset Control	40060	Y N	0-1
G6.3	**3 DINPUT1 SEL=4**	Multifunction 1 input	40061	0 to 10	0-10
G6.4	**4 DINPUT2 SEL=0**	Multifunction 2 input	40062	0 to 10	0-10
G6.5	**5 DINPUT3 SEL=0**	Multifunction 3 input	40063	0 to 10	0-10
G6.6	**6 DINPUT4 SEL=0**	Multifunction 4 input	40064	0 to 10	0-10
G6.7	**7 DINPUT5 SEL=0**	Multifunction 5 input	40065	0 to 10	0-10
G6.8	**8 ANI1 FORMAT =1**	Analogue Input 1 Format	40066	0 to 2	0-2
G6.9	**9 AI1 RANGE 0_10**	Analogue Input 1 Range	40067	0_0 to 0_999	0-999
G6.10	**10 AI1 UNITS=OFF**	Analogue Input 1 Units	40068	OFF, Bar ºC Mtr	0-3
G6.11	**11 ANI2 FORMAT =1**	Analogue Input 2 Format	40069	0 to 2	0-2
G6.12	**12 AI2 RANGE 0_10**	Analogue Input 2 Range	40070	0_0 to 0_999	0-999
G6.13	**13 AI2 UNITS=OFF**	Analogue Input 2 Units	40071	OFF, Bar ºC Mtr	0-3
G7.1	**1 REL1 SEL ON=14**	Relay 1 control Source Selection	40073	0 to 21	0-21
G7.2	**2 REL2 SEL ON=15**	Relay 2 control Source Selection	40074	0 to 21	0-21
G7.3	**3 REL3 SEL ON=9**	Relay 3 control Source Selection	40075	0 to 21	0-21
G7.4	**4 ANALOG1 SEL=0**	Analogue Output 1 Source Selection	40076	0 to 7	0-7
G7.5	**5 AO1 FORMAT=0**	Analogue Output 1 Format	40077	0 to 1	0-1
G7.6	**6 AO1 LOW=0%**	Analogue Output 1 Low Set point	40078	0 to 500%	0-100
G7.7	**7 AO1 HIGH=100%**	Analogue Output 1 High Set point	40079	0 to 500%	100-500
G8.1	**1 DUALSETING=N**	Dual Setting	40081	Y N	0-1
G8.2	**2 PLS TORQ2=50%**	Dual setting Torque Pulse	40082	50 to 100%	50-100
G8.3	**3 PLS TQ T2=OFF**	Dual Setting Pulse Time	40083	OFF, 0.1 to 0.9s	0-9
G8.4	**4 INIT TRQ2 =30%**	Dual Setting Initial Torque	40084	30 to 99%	30-99
G8.5	**5 T PAR INI2=1s**	Dual Setting Torque Time	40085	0 to 10s	0-10
G8.6	**6 ACC TIME2=12s**	Dual Setting Acceleration Time	40086	0 to 180s	1-180
G8.7	**7 LTE INT2=2800A**	Dual Setting Current Limit	40087	(1.5 a 5)·In del VS65	300-1000
G8.8	**8 FREWEL STP2=N**	Dual Setting Freewheel Stop	40088	SI NO	0-1
G8.9	**9 DEC TIME2=12s**	Dual Setting Deceleration Time	40089	0 to 180s	1-180
G8.10	**10 DEC MD SEL2= 1**	Dual Setting Deceleration Mode Selection	40090	1 to 2	300-1000
G8.11	**11 HAMR FAC2=75%**	Dual Setting Hammer Factor	40091	1 to 99%	-
G8.12	**12 MINI TRQ2=1%**	Dual Setting Minimum Torque	40092	1 to 99%	-
G8.13	**13 PHASE SEQ2=2**	Dual Setting in phase sequence soft starter input	40093	1 to 3	1-3
G8.14	**14 OV LOAD2=InA**	Dual Setting Overload Motor Current	40094	(0.6 to 1.5)·InVS65	120-300
G8.15	**15 OV/LOAD T2=5**	Dual Setting Overload Curve	40095	1 to 10	1-10
G8.16	**16 OVL FAC2=100%**	Dual Setting Starting Overload Factor	40096	100 to 500%	100-500

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Parameter	Screen	Description	Address	Range	Modbus Range
G8.17	**17 MTR PTC2=N**	Dual Setting Motor PTC Option	40097	YES NO	0-1
G8.18	**18 UNLOAD2=0.0A**	Dual Setting Underload Setting	40098	(0 to 0.9)·In VS65	0-180
G8.19	**19 UNLOAD T2=OFF**	Dual Setting of Underload Delay	40099	0 to 99s, OFF	0-100
G8.20	**20 SHEARP2=OFF**	Dual Setting Shearpin Current	40100	0.6 to 1.2)·In VS65, OFF	120-241
G8.21	**21 ASYM I ENB2=N**	Dual Setting Asymmetrical Current	40101	YES NO	0-1
G8.22	**22 I MOTR2=30**	Dual Setting Motor Rated Current	40102	1 to 1200A	1-1200
G8.23	**23 V MTR2=2**	Dual Setting Motor Rated Voltage	40103	1 to 4	1-4
G8.24	**24 P MTR 2 =xxxkW**	Dual Setting Motor Rated Power	40104	4 to 999kW	40-9990
G8.25	**25 COS PHI 2 =85%**	Dual Setting Motor Power Factor	40105	40 to 99%	40-99
G8.26	**26 FREQ 2= 50Hz**	Dual Setting Supply Frequency	40106	50Hz 50/60Hz	0-1
G10.1	**1 NO FAULT**	Register 1 Fault History	40124		-
G10.2	**2 NO FAULT**	Register 2 Fault History	40125		-
G10.3	**3 NO FAULT**	Register 3 Fault History	40126		-
G10.4	**4 NO FAULT**	Register 4 Fault History	40127		-
G10.5	**5 NO FAULT**	Register 5 Fault History	40128		-
G10.6	**6 DELET FAULTS=N**	Delete Fault History	40129	YES NO	0-1
G11.1	**1 STARTS1 00000**	Total Number of Starts 10k	40131	0..9999	-
G11.1	**1 STARTS1 00000**	Total Number of Starts	40132	0..9999	-
G11.2	**2 STARTS2 00000**	Partial Number of Starts 10k	40133	0..9999	-
G11.2	**2 STARTS2 00000**	Partial Number of Starts	40134	0..9999	-
G11.3	**3 DEL STARTS2=NO**	Delete Number of Starts	40135	0..1	-
G11.4	**4 H1 =00000h:00m**	Total Number of Hours 10k	40136	0..9999	-
G11.4	**4 H1 =00000h:00m**	Total Number of Hours	40137	0..9999	-
G11.5	**5 H2= 00000h:00m**	Working Hours Counter 2 10k	40141	0..9999	-
G11.5	**5 H2= 00000h:00m**	Working Hours Counter 2	40142	0..9999	-
G11.6	**6 DEL HOURS2=NO**	Delete Hours Counter 2	40144	0..1	-
G11.7	**7 TOTAL FLT=00**	Total Faults Counter	40145	0..9999	-
G11.8	**8 FAULT 2=0**	Total Faults Counter 2	40146	0..9999	-
G11.9	**9 DEL FAULT2=NO**	Delete Fault Counter 2	40147	0..1	-
G11.10	**10 KWH=000000**	Total KWH consumption	40148	0..9999	-
G11.11	**10 KWH=000000**	Total KWH consumption 10k	40149	0..9999	-
G14.1	**1 COM TIME O=OFF**	Serial Communication Time Out	40164	OFF, 0 to 25s	0-26
G14.2	**2 DIR COMMS=10**	Modbus communication address Modbus	40165	0 to 240	0-240
G14.3	**3 BAUDIOS=9600**	Default communication speed	40167	OFF 1200 2400 4800 9600	-0-4
G14.4	**4 EVEN PARITY=N**	Modbus Communication Parity	40167	YES NO	0-1
G15.1	**1 AUTO RESET=NO**	Automatic Reset	40169	YES NO	0-1
G15.2	**2 ATTEMP NUMBR=5**	Number of Auto Reset Trials before Tripping	40170	1 to 5	1-5
G15.3	**3 R STR DEL=5s**	Delay before Reset	40171	5 to 120s	5-120
G15.4	**4 RS COUNT=15Min**	Delay Time after Attempt before Reset	40172	1 to 60Min	1-60
G15.5	**5 F1 AUTO RST=0**	Auto Reset Fault 1 Configuration	40173	0 to 20	0-20
G15.6	**6 F2 AUTO RST=0**	Auto Reset Fault 2 Configuration	40174	0 to 20	0-20
G15.7	**7 F3 AUTO RST=0**	Auto Reset Fault 3 Configuration	40175	0 to 20	0-20
G15.8	**8 F4 AUTO RST=0**	Auto Reset Fault 4 Configuration	40176	0 to 20	0-20
G16.1	**1 SET IT=INF**	Irrigation Time Setting	40212	0.0 to 60.0Hrs, INF	0-601
G16.2	**2 I TIME=000Hrs**	Irrigation Time Display	40213	0.0 to 60.0Hrs, INF	0
G16.3	**3 START MODE = 0**	Start Mode Selection	40214	0 – 1	0-1
G16.4	**4 HI PR DEL=0s**	High Pressure Time Out	40215	0 to 60s	0-60
G16.5	**5 L PR DEL=20s**	Low Pressure Time Out	40216	0 to 3600s	0-3600
G16.6	**6 L PR BYP=10s**	Low Pressure Bypass Time	40217	0 to 1800s (30min)	1-1800
G16.7	**7 FLO BYP=10s**	No flow Start Bypass Time	40218	0 to 1800s	0-1800
G16.8	**8 FLO DEB=10s**	No Flow Debounce Delay	40219	0 to 60s	0-60
G16.9	**9 LO WTR DEL=10s**	Deep Well Probe Delay	40220	0 to 60s	0-60

6. FAULT MESSAGES. DESCRIPTION AND ACTIONS

FAULT TRIPS

When a fault occurs, the VS65 will stop the motor and will display the fault that caused the trip. The red LED and fault message will remain until the fault has been removed and the soft starter is reset.

Fault	**F0 NO FAULTS**
Description	No fault detected.
Possible Cause	Normal operation.
Action	None required.

Fault	**F1 PHA MISING**
Description	Supply phase loss.
Possible Cause	Loss of phase, fuse failure, cable fault, motor winding fault.
Action	Check supply, all cables including thyristors, and motor. If the problem persists, call Power Electronics or an authorised distributor**.**

Fault	**F2 WRONG PH / SQ**
Description	Incorrect input supply phase sequence.
Possible Cause	The mains phase sequence doesn't correspond to G3.1 (1 PHASE SEQUEN=2)
Action	Swap two input phase over or change G3.1 Phase Sequence to suit supply phase sequence.

Fault	**F3 ASYM CURR**
Description	Phase current imbalance.
Possible Cause	There is a current imbalance higher than 40%.
Action	Check the motor; check the load and the coupling between both. Check input power supply is always balanced. Check thyristors. If the problem persists, call Power Electronics or an authorised distributor.

Fault	**F4 OVERLOAD.**
Description	Calculated motor overload has reached an unacceptable level.
Possible Cause	Motor overload. If the trip is produced during start, it could be a mechanical problem. If it occurs when the motor is running at nominal speed, probable causes could be a wrong setting at G.3.2. screen or a change of the load conditions. Wrong nameplate values.
Action	Check that current from the G3.2 screen is the same as the motor. Check working conditions and connections of motor. Check load. Check nameplates. .

Fault	**F5 UNDERLOAD.**
Description	Motor under load.
Possible Cause	Motor current draw is lower than that set in G3.6 screen. Soft starter has been working during for longer than the one set in G3.7 screen. Motor working with no load. Wrong setting of under load conditions.
Action	Check that mechanical parts coupled to the motor are ok and that the motor is not working unloaded. In case of pump application, check there is no air inside the pipe network and that the pump suction is not obstructed. Wrong adjustment, set again under load settings G3.6 and G3.7.

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Fault	**F6 PEAK CURR**
Description	VS65 peak current output exceeded. The current is higher than six times nominal.
Sense level	(6xIn). VS65 Rated Current.
Possible Cause	Rotor locked. Short circuit in output circuit. VS65 current transformers failure. Torque pulse setting too high.
Action	Check cables and motor. Reduce Torque pulse setting. **If the problem persists, call Power Electronics or an authorised distributor.**

Fault	**F7 STARTER OT**
Description	Heat sink too hot (>85ºC).
Sense level	(> 85°C).
Possible Cause	Insufficient cooling. Fan failure. Ambient temperature too high (>45ºC). The actual current is higher than the nominal.
Action	Check fans and cooling paths. Check the ambient temperature during normal operation doesn't exceed 45ºC or 50ºC with re-rating. Check that correct re-rating has been applied if higher than 45ºC. Check that actual motor current is the same or smaller than the VS65 nominal current.

Fault	**F8 MOTOR PTC .**
Description	Not used for this soft starter.

Fault	**F9 SHEARPIN**
Description	Shearpin current trip.
Sense level	G3.8 Shearpin Current.
Possible Cause	The motor has drawn a higher current than Shearpin protection setting at G3.8. Rotor locked due to a mechanical obstruction.
Action	Check if it's possible that motor reaches the Shearpin current under normal operation, and if so, increase the value of that protection. Check motor, cables and load and the reason of the over current.

Fault	**F10 OVER VOLT**
Description	High supply voltage for too long period.
Sense level	The combination of parameters G3.12 OVERVOLTAGE and G3.13 OVERVOLTAGE DELAY.
Possible Cause	Fluctuating power supply, wrong settings; the input voltage of each phase in parameter G3.12; and the time set in G3.13.
Action	Check supply voltage and set G3.12 and G3.13. Check supply.

Fault	**F11 UNDER VOLT**
Description	Low voltage supply for too long period.
Sense level	The combination of parameters G3.10 UNDERVOLTAGE and G3.11 UNDERVOLTAGE DELAY.
Possible Cause	Impedance of input power supply is too high. Excess current draw, weak supply. Check the input voltage of each phase is higher than G3.10 parameter and during the time set in G3.11 parameter.
Action	Check supply, check values at G3.10 and G3.11. Check supply.

Fault	**F12 EXCESIV STR**
Description	Maximum number of starts exceeded.
Sense level	Maximum number of starts set at G3.14 START LIMIT during time period set at G3.15 SRT/INT.
Possible Cause	Excessive number of starts/stop during the normal operation. Rotor locked or motor overloaded during the start so the ramp up couldn't be completed.
Action	Check motor and load conditions. Check values of parameters G3.14, G3.15 are coherent with the application.

Fault	**F13 MEMORY FLT**
Description	Fault reading SRAM.
Possible Cause	Writing error, faulty memory.
Action	Attempt to reinitialise the VS65 (1.5 INITIALISE).

Fault	**F14 SCR1 FAULT** **F15 SCR2 FAULT** **F16 SCR3 FAULT** **F17 SCR_S FLT**
Description	F14 Thyristor Fault L1, disconnected motor at L1. F15 Thyristor Fault L2, disconnected motor at L2. F16 Thyristor Fault L3, disconnected motor at L3. F17 Thyristors Fault, disconnected motor.
Possible Cause	Thyristor fault, motor disconnected, excessive number of starts, excessive temperature, over voltage.
Action	Check motor, cables and fans. Check thyristors and excessive environmental temperature. Check input supply voltage. **If the problem persists, call Power Electronics or an authorised distributor.**
NOTE:	***This fault can only be reset via the display unit.***

Fault	**F18 EXCES T LS**
Description	Not used with this soft starter.

Fault	**F19 LS DISABLE**
Description	Slow Speed not allowed.
Possible Cause	Slow Speed mode is blocked if one of these 2 options are selected: • No phase sequence (G3.1 Phase Sequence) at the input. You need to select L1 L2 L3 or L2 L1 L3 sequence. • DC Brake stop selected (G13.1 DC Brake).
Action	Set phase sequence at the input. Make sure no DC Brake is selected.

Fault	**F20 COMS T/OUT**
Description	Serial communication Time Out exceeded.
Possible Cause	No communication from the Master for the time specified at G14.1 CommTime Out. RS232/RS485 communication link fault.
Action	Check if the Master is trying to communicate to slave at a rate higher than specified at G14.1 COM TIME O. Check the RS232/RS485 wiring. Check communication parameters.

Fault	**F21 EXTRN TRIP**
Description	An external fault has occurred through a digital input.
Possible Cause	There is a digital input activated and set as external fault.
Action	Check configuration of digital inputs. Check the status of the digital inputs for correctness.

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Fault	**F22 CUR FLT**
Description	Large current unbalance is occurring among phases.
Possible Cause	Large current unbalance occurs due to a sudden voltage drop in any of the VS65 input phases. Possible disconnection of one phase.
Action	Check input power wiring. Check motor connection. Check supply voltage is correct.

Fault	**F23 CUR FLT 2**
Description	Large current unbalance is occurring among phases.
Possible Cause	Large current unbalance occurs due to a sudden voltage rise in any of the VS65 input phases.
Action	Check input power wiring. Check supply voltage is correct.

Fault	**F24 HIGH PRESSURE**
Description	High pressure time protection.
Possible Cause	The VS65 is running and the pressure switch opens for longer than the time entered in screen G16.4. Overpressure.
Action	Check hydraulic installation. Check pressure switch. Check proper wiring from pressure switch to VS65 digital input 1. The VS65 will require resetting on the display or via D INPUT 5 if configured for 2 wire start/stop. Check parameter setting is done according to application requirements.

Fault	**F25 LOW PRESSURE**
Description	Low pressure protection.
Possible Cause	The VS65 is running and the pressure switch opens for longer than the time entered in screen G16.5.
Action	Check hydraulic installation (broken pipes). Check pump has got water. Check pressure switch. Check proper wiring from pressure switch to VS65 digital input 2. The VS65 will require resetting on the display or via D INPUT 5 if configured for 2 wire start/stop. Check parameter setting is done according to application requirements.

Fault	**F26 FLOW SWITCH**
Description	No flow protection.
Possible Cause	The flow switch is ignored for the time set in screen G16.7 on receipt of a valid start signal. After this time the VS65 will trip if no flow is indicated for longer than the time set in screen G16.8. No water in the pump.
Action	Check proper pump water supply. Check flow switch. Check proper wiring form flow switch to VS65 digital input 3. The VS65 will require resetting on the display or via D INPUT 5 if configured for 2 wire start/stop. Check parameter setting is done according to application requirements.

Fault	**F27 DEEP WELL PROBE**
Description	Low level protection
Possible Cause	The well probe controller (or other level controller) detects a lack of water. The tank or pump has no water.
Action	Check water level. Check hydraulic installation. Check level switch. Check proper wiring from deep well probe flow controller to VS65 digital input 4. The VS65 will not reset unless the low water fault has been cleared (D INPUT 4 closed). Check parameter setting is done according to application requirements.

7. TYPICAL CONFIGURATION

7.1. Start

SCREENS	CURRENT LIMIT START	VOLTAGE RAMP AND CURRENT LIMIT START			CONSTANT ACCELERATION START (DTC)	TORQUE PULSE START (LOCKED ROTOR)
		Light	Medium	Heavy		
G4 1 STR DELAY=	0s	0s	0s	0s	0s	0s
2 PULS TORQ =	35-40%	35%	40%	50%	40- 45%	70 - 80 %
3 PULS TQ T =	OFF	OFF	OFF	OFF	OFF	0,2-0,5
4 INIT TORQ =	35-40%	35%	40%	50-60%	40- 45%	50 - 70 %
5 INIT TQ T =	0 s	0	0	1	1s-2s	0-10
6 ACEL TIME =	1s	4 – 6s	4 – 6s	6 – 8s	10s-30s	1-180
7 I LIMIT =	3.5 -4 x In	3 – 3.5 In	3.5 – 4 In	4 – 5 In	2,5 – 3 In	3,5 x In

7.2. Stop

SCREENS	DEFAULT PARAMETERS	SPIN STOP	VOLTAGE RAMP STOP
G5. 1 FREWEL STP =	Y	YES	NO
2 DECL TIME =	12s	-	f (load)
3 DEC MD SEL =	1*	-	1
4 HAMR FACT =	75%	-	-
5 MINI TORQ=	1%	-	-

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8. CONFIGURATION REGISTER

DIGITAL SOFT STARTER: **VS65**
SERIAL Nº: MODEL:
APPLICATION : SERIE
DATE:
CUSTOMER :

SCREENS	RANGE	DEFAULT	RECORD 1	RECORD 2
G1 MENU OPTIONS				
1 LOCK PARAM=	Yes/No	N0		
2 PASSWORD=	0000-9999	0		
3 WRONG P/W=	0000-9999	XXXX		
4 LANGUE=	Span., Eng., D	ENGLISH		
5 INITIALISE=	Yes/No	NO		
6 COMMISSION=	Yes/No	YES		
G2 NAMEPLATE				
1 ISTARTER=	9 - 1600	_ _ _A*		
2 I MOTOR=	1 - 1600	_ _ _A *		
3 V MOTOR=	1/2/3/4	2*		
4 P MOTOR=	4 - 999	_ _ _KW		
5 COS PHI M=	40 – 99%	85%		
6 FREQ=	50/60	50Hz		
G3 PROTECTIONS				
1 PHASE SEQUEN=	1/2/3	2*		
2 OV LOAD=	0,5-1,5 I_{VS65}	1 x I		
3 OV/LOAD T=	1-10	5		
4 OVL FAC=	100-500%	100%		
6 UNLOAD=	0-0,8	0.0A		
7 UNLOAD T=	0-99/Off	OFF		
8 SHRPIN=	0,6-1,2/Off	OFF		
9 ASYM I ENB=	Yes/No	YES		
10 UNDER V=	162-450	5052V		
11 U/V DELAY=	0-10/Off	5s		
12 OVERVOLT=	254-575	6947V		
13 O/V DELAY=	0-10/Off	5s		
14 START LIMIT=	1-10	3		
15 STR/ INT=	0-60/Off	15Min		
G4 ACCELERATION				
1 STR DELAY=	0-600	0s		
2 PULS TORQ=	50-99%	50%		
3 PULS TQ T=	0,1-0,9/Off	OFF		
4 INIT TORQ=	0-100%	35%		
5 INIT TQ T=	0-99	1s		

* See section '11 SCREEN DESCRIPTION'.

SCREENS	RANGE	DEFAULT	RECORD 1	RECORD 2
6 ACEL TIME=	0-180	6s		
7 I LIMIT=	1.5 - 5 x In	xxxxA		
G5 DECELERATION				
1 FREWEL STP=	Yes/No	YES		
2 DECL TIME=	0-180	12s		
3 DEC MD SEL=	1/2	1*		
4 HAMR FACT=	0-100%	75%		
5 MINI TORQ=	0-80%	1%		
G6 INPUTS				
1 OPER MODE=	1/2/3/4/5	1*		
2 LOCAL RESET=	Yes/No	Y		
3 DINPUT1 SEL=	0-10	4*		
4 DINPUT2 SEL=	0-10	0*		
5 DINPUT3 SEL=	0-10	0*		
6 DINPUT4 SEL=	0-10	0*		
7 DINPUT5 SEL=	0-10	0*		
8 ANI1 FORMAT=	0/1/2	1		
9 AI1 RANGE=	0-100	0-10		
10 AI1 UNITS=	Off/Bar/°C/m	OFF		
11 ANI2 FORMAT=	0/1/2	1		
12 AI2RANGE=	0-100	0-10		
13 AI2 UNITS=	Off /Bar/°C/m	OFF		
G7 OUTPUTS				
1 REL1 SEL ON=	1-21	14*		
2 REL2 SEL ON=	1-21	15*		
3 REL3 SEL ON=	1-21	9*		
4 ANLOG1 SEL=	0-7	0*		
5 AO1 FORMAT=	0/1	0*		
6 AO1 LOW=	0-500	0%		
7 AO1 HIGH=	0-500	100%		
G8 DUAL SETTING				
1 DUALSETING=	Yes/No	NO		
2 PLS TORQ2=	50-99%	50%		
3 PLS TQ T2=	0,1-0,9/Off	OFF		
4 INIT TRQ2=	0-100%/Off	30%		
5 INIT TQ T2=	0-99	1s		
6 ACC TIME2=	0-180	12s		
7 I LIMIT2=	1-5 I_{VS65}	xxxxA		
8 FREWEL STP2=	Yes/No	N		
9 DEC TIME2=	0-180	12s		
10 DEC MD SEL2=	1/2	1		
11 HAMR FAC2=	0-99	75		
12 MINI TRQ2=	1-99%	1%		
13 PHASE SEQ2=	1/2/3	2s		

* See section '10 SCREEN DESCRIPTION'.

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SCREENS	RANGE	DEFAULT	RECORD 1	RECORD 2
14 OV LOAD2=	0,6-1,5 I_{VS65}	xxxxA		
15 OV/LOAD T2=	1-10	5		
16 OVL FAC2=	100-500%	100%		
17 MTR PTC2=	Yes/No	N		
18 UNLOAD2=	0-0,9	0.0A		
19 UNLOAD T2=	0-99/Off	OFF		
20 SHRPIN2=	0,7-1,2/Off	OFF		
21 ASYM I ENB2=	Yes/No	N		
22 I MTR2=	9-1200	30A		
23 V MTR2=	1/2/3/4	2		
24 P MTR2=	0-999	xxxxKw		
25 COS PHI 2=	40-99%	85%		
26 FREQ 2=	50/60	50Hz		
G10 FAULT HISTORY				
1 LAST FAULT		F0		
2 FOURTH FAULT		F0		
3 THIRD FAULT		F0		
4 SECOND FAULT		F0		
5 FIRST FAULT		F0		
6 DELET FAULTS=		N		
G11 STATIST INFO				
1 STARTS1=	**0-9999**	00000		
2 STARTS2=	0-9999	00000		
3 DEL STARTS2=	0-1	NO		
4 H1=	0-9999	00000h:00m		
5 H2 =	0-9999	00000h:00m		
6 DEL HOURS2=	0-1	NO		
7 TOTAL FLT=	0-9999	00		
8 FAULT2=	0-9999	0		
9 DEL FAULT2=	0-1	NO		
10 KWH =	0-9999	000000		
G14 SERIAL COMM				
1 COM TIME O=	0-25/ Off	OFF		
2 COM ADRESS=	0-240	0		
3 BAUD COM=	1200/2400/ 4800/9600/ Off	OFF		
4 EVEN PARITY=	Yes/No	NO		
G15 AUTO RESET				
1 AUTO RESET=	Yes/No	NO		
2 ATTEMP NUMBR=	1-5	5		
3 R STR DEL=	5-120	5s		
4 RS COUNT=	1-60	15Min		
5 F1 AUTO RST =	0-20	0		
6 F2 AUTO RST =	0-20	0		
7 F3 AUTO RST =	0-20	0		
8 F4 AUTO RST =	0-20	0		

SCREENS	RANGE	DEFAULT	RECORD 1	RECORD 2
G16 PUMP CONTROL				
1 SET IT =	0-60/INF	000Hrs		
2 I TIME =	0-60/INF	000Hrs		
3 START MODE =	0/1	0		
4 HI PR DEL =	0-60	00s		
5 L PR DEL=	0-3600	0000s		
6 L PR BYP =	1-1800	0000s		
7 FLO BYP =	0-1800	0000s		
8 FLO DEB =	0-60	00s		
9 LO WTR DEL =	0-60	00s		

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DECLARATION OF CONFORMITY CE

The company:

Name: **POWER ELECTRONICS ESPAÑA, S.L.**
Address: C/ Leonardo Da Vinci, 24-26, 46980 Paterna (Valencia) España
Telephone: +34 96 136 65 57
Fax: +34 96 131 82 01

Declares under its own responsability that the product:

Medium Voltage Soft Starter

Brand: Power Electronics
Model name: VS65 Series

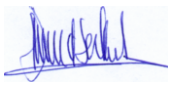
Is in conformity with the following European Directives:

References	Title
2004/108/CE	Electromagnetic Compatibility

References of the harmonized technical norms applied under the Electromagnetic Compatibility Directive:

References	Titles
EN 61000-6-4:2007	Electromagnetic Compatibility (EMC). Part 6-4: Generic norms. Emission norm for industrial environments
EN 61000-6-2:2005	Electromagnetic Compatibility (EMC). Part 6-2: Generic norms. Immunity norms for industrial.

Paterna, December 17 th December 2008



David Salvo
Executive Director

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