E-Series
Profibus Interface
Technical Manual

Part Number 4201-234 Revision A

IMPORTANT

This manual must be used in conjunction with the *E-Series AC Flux Vector Drive Technical Manual - Part Number 4201-180*.

Read and understand the procedures described in both manuals before attempting to install or commission your drive.

If in doubt, before proceeding, please contact Bardac Drives at:

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SECTION 1: TECHNICAL DATA

MECHANICAL CONSTRUCTION

Format (height x width x depth)	281 x 35 x 87.5mm, metal enclosure
Type of mounting	DIRECT
Degree of ingress protection	IP20

INTERFACES

PROFIBUS-DP	9 Pin D-SUB / F
Power	3 way 45° screw terminal/plug
RS232	3 way 45° screw terminal/plug
Xtravert	3 way 45° screw terminal/plug

POWER SUPPLY

Nominal value	24Vdc
Allowable range (including ripple)	18 to 28Vdc
Maximum power consumption	250mA
+24V supply fuse	“2A”, PDL Part No., 2401-017

ELECTRICAL INSULATION

PROFIBUS-DP / RS232 connection	500Vac
PROFIBUS-DP / Xtravert connection	500Vac

LOCAL INDICATIONS

Operating voltage	green LED (UL)
Data Exchange	green LED (DE)
Bus Fault	red LED (BF)
Interface status	7 segment red LED

PROFIBUS-DP INTERFACE

Interface	PROFIBUS-DP
Baudrate	Auto detected to 12 Mb
Diagnostic Data Length	13 Bytes (max.)
Parameterisation Data Length	230 Bytes (max.)
Configuration Data Length	1 Byte (max.)
Polled Data Length	12 Bytes (max.)
Supported services	Freeze, Sync, Set slave address
GSD file	PDL_04B6.GSD
Profile	PROFIDRIVE

MOTOR CONTROLLERS SUPPORTED

Elite Series, software revision 2.5 or greater.
Xtravert Series, software revision 2.1 or greater.

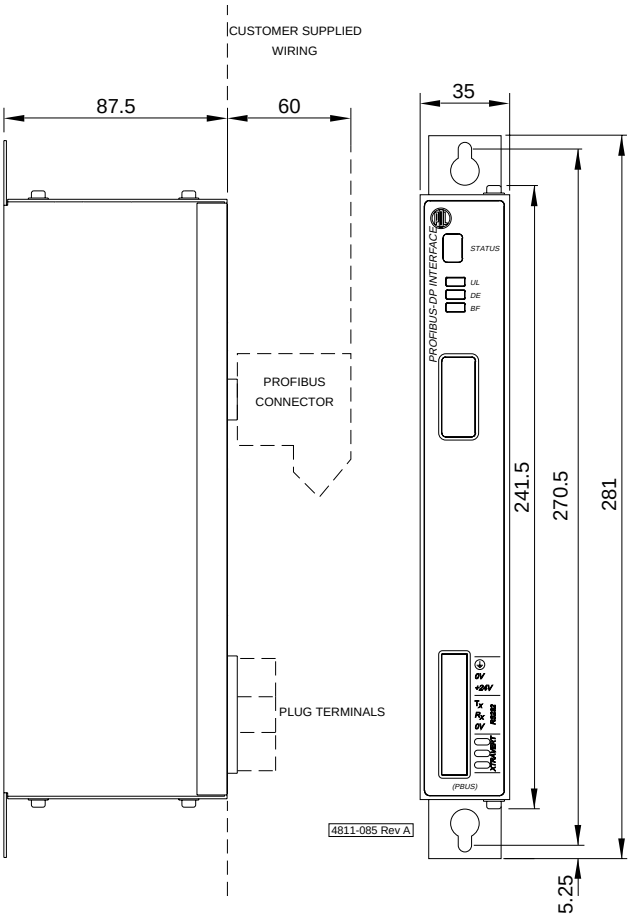


Figure 1.1: Dimensions

SECTION 2: GETTING STARTED

The PDL Electronics PROFIBUS Interface (PBUS) is a stand-alone module designed to allow direct connection of PDL Electronics motor controllers into PROFIBUS networks. One PBUS interface is required for every PDL Electronics motor controller that is to be connected into the network.

NOTE:

This installation note assumes that the motor controller has been commissioned and that all power and control wiring has been completed.

WARNING:

PDL Electronics motor controllers operate from high energy electrical supplies. Ensure that the supply is isolated and allow approximately five minutes for the DC bus to discharge before attempting installation of the PROFIBUS interface module. PDL motor controllers contain static sensitive printed circuit boards. Use static safe procedures when handling these boards and the PROFIBUS interface module.

2.1 MOUNTING OF THE PBUS INTERFACE

The PBUS interface should be mounted in close proximity to the motor controller. If required the interface can be mounted up to a maximum of 3m from the motor controller.

2.2 PROFIBUS CONNECTIONS

The PBUS interface uses the standard 9 pin D-SUB connector as defined in EN 50170.

Wiring diagrams for the 9 pin D-SUB connector are shown below in Fig. 2.5.

Refer to the Installation Guideline for PROFIBUS DP/FMS from the PROFIBUS user group for further details regarding the cable connections.

PROFIBUS Guideline, Order No. 2.112 (English).

2.3 MOTOR SPEED CONTROLLER CONNECTIONS - ELITE SERIES

Commissioning

Commission the Elite as per commissioning instructions given in the Elite Series Technical Manual PDL Part No. 4201-180. Adjust Screen H1 - Protocol to MODBUS. Set Screen H3a to COMMS ADR=10 and Screen H3b BAUDRATE=9600.

Isolation

Disconnect the supply to the Microdrive Elite. Allow time for the DC Bus to discharge.

The front cover of the Microdrive Elite can be removed by unscrewing the six fixing screws (Refer Fig. 2.1).

Cable Connections
Install connection cable through cable glands and terminate on to the terminals of the Elite Series as per the wiring diagram show (Refer Fig. 2.2).

2.4 MOTOR SPEED CONTROLLER CONNECTIONS - XTRAVERT

Commissioning
Commission the Xtravert as per commissioning instructions given in the Xtravert Technical Manual PDL part No., 4201-196. Adjust Screen H1 to COMMS ADR=10.

The PBUS Interface writes the speed reference value into the local speed screen (Screen A1). For the Interface to work correctly Screen I2 should be set to I2 REF SP=LOCAL.

The setting for the communications Time-out parameter determines the action taken to possible network and cabling faults.

Possible settings for Screen H2 Comms T/O are as follows:

OFF	Xtravert will continue with old settings if communications is lost.
1 Sec	Xtravert will trip if communications with the PROFIBUS master is lost or the communication between the PBUS interface and the Xtravert is lost.
5 Sec	Xtravert will continue with old settings if communications with the PROFIBUS master is lost but will trip if the communication between the PBUS interface and the Xtravert is lost.

Isolation
Disconnect the supply to the Xtravert. Allow time for the DC bus to discharge completely.

Remote Display Removal
Grasping the remote display firmly, pull this forward away from the drive. This will expose the cable connecting the display unit to the Xtravert Control Board. Disconnect all three wires from the screw terminals and place the display aside. (Refer Fig. 2.3).

Cable Connections
Connect the three wires from the cable attached to the PROFIBUS interface Xtravert terminals into the connector on the Xtravert Control PCB following the color codes indicated. An external 24Vdc power supply is required to power the PROFIBUS interface. Connect the 24Vdc supply as per the wiring diagram. (Refer Fig. 2.4)

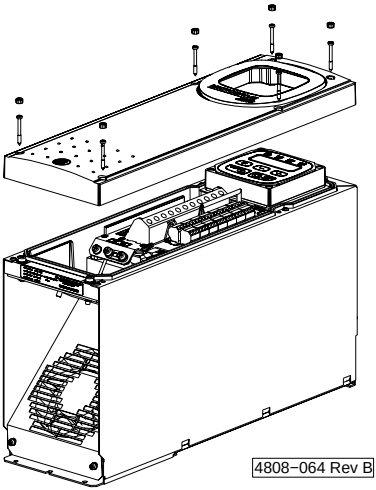


Figure 2.1: Microdrive Elite Front cover

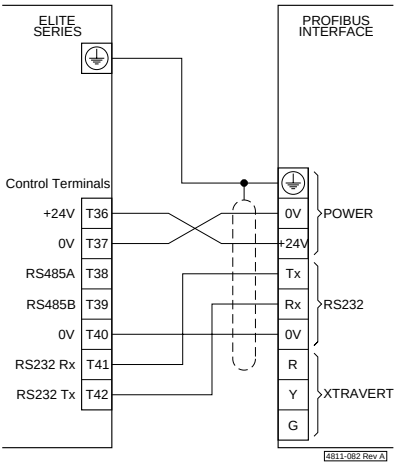


Figure 2.2: Elite Cable Connections

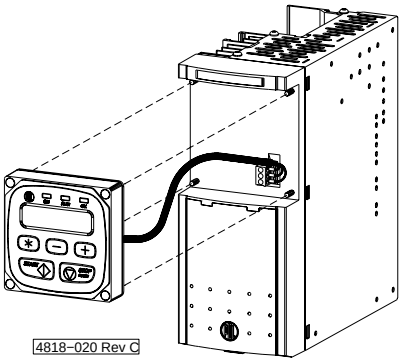


Figure 2.3: Remote Display Removal

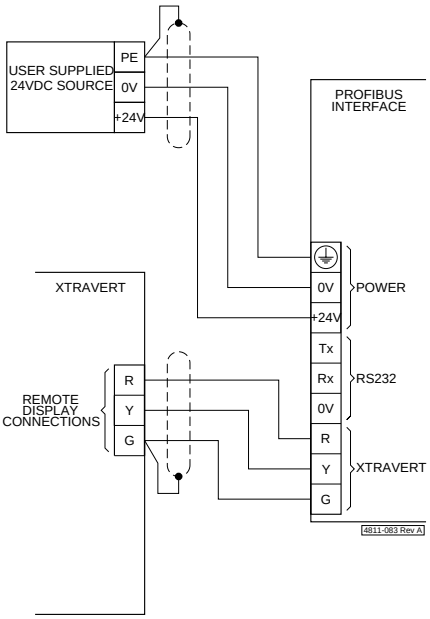
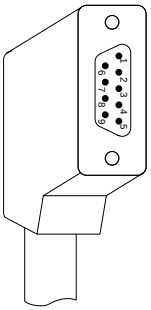


Figure 2.4: Xtravert Cable Connections

PROFIBUS CONNECTOR

9 PIN D-SUB
MALE



1	N/C
2	N/C
3	B LINE
4	RTS LINE
5	GND
6	+5V
7	N/C
8	A LINE
9	N/C

Figure 2.5: Profibus Connections

SECTION 3: STATUS DISPLAY

The current status of the PBUS interface is indicated by a red seven segment LED display which is located above the PROFIBUS-DP status LEDs. The status display indicates the overall status of the PBUS interface with a combination of static and flashing codes.

THREE HORIZONTAL BARS
The interface has finished all the initialisation functions and is trying to establish communications with the motor controller. Check the motor controller has power applied and that the MODBUS Communication Address is set to 10 and that the Baudrate is set to 9600 baud.

ROTATING BAR PATTERN
Communication is established between the PBUS interface and the motor controller and that the motor controller does not have any faults.

FLASHING NODE NUMBER "n" "X" "X" "X"

Once every 15 seconds the display will show the node number of the PBUS interface. This will be in the range of 1-126, by default the devices are shipped with the slave address set to 126.

FLASHING FAULT CODE "F" "X" "X" "X"
This indicates that there is communication between the PBUS interface and the motor controller and that the motor controller has tripped on the indicated fault. Refer to Appendix A for a list of the fault codes

FLASHING FAULT CODE "H" "X" "X" "X"
During the power on self test sequences a major hardware fault has been detected and the PBUS interface can not continue to function correctly. Note this fault code and return to factory for service. Refer to Appendix A for a list of the fault codes.

FLASHING DECIMAL POINT
The decimal point of the status display should continually flash. If this is not flashing then service is required.

SECTION 4: PARAMETERISATION, CONFIGURATION AND DIAGNOSTICS

Prior to any I/O data being exchanged with a slave device on a Profibus network the slave device must be configured by the Profibus master. There are three main services the Profibus master uses during this start-up phase which are described below.

4.1 DIAGNOSTICS

In between the normal I/O data cycles and during the startup stages of the network the Profibus master is always polling the network to find new slave devices by sending diagnostic requests. Diagnostic requests allow the Profibus master to determine if a slave interface has been configured by reading a network state machine in the slave. The master will issue the parameterisation and configuration requests to all slaves that are not setup.

Once the slave has entered the data exchange mode diagnostics are only used if the slave issues a diagnostic message to the Profibus master to inform the master of a change in operating status. Extensive use of the diagnostic features has been made by the PBUS interface for the reporting of PBUS interface errors and motor controller faults.

4.2 PARAMETERISATION

The parameterisation message is a record (up to 244 bytes long) containing the values of all the drive parameters, the PBUS interface uses this information to configure all the drive parameters at startup prior to entering the Data exchange mode.

The Parameterisation message is created using configuration tools such as COM PROFIBUS from Siemens and is stored in the PROFIBUS master device.

4.3 CONFIGURATION

The configuration message sets the size of the I/O transfer to the slave. The PBUS interface accepts either 4,8 or 12 bytes I/O Length.

4.4 DATA EXCHANGE

Once the Parameterisation and Configuration telegrams have been accepted the SPC3 ASIC will then enter the Data exchange mode. In this mode the PBUS interface will exchange I/O data with the PROFIBUS master device.

SECTION 5: INPUT / OUTPUT DATA FORMAT

The PDL Electronics PROFIBUS interface (PBUS) is a modular interface which can be configured in one of nine different modes. These modes are similar and differ in drive type, parameterisation features and the I/O configurations. Ignoring the drive type and parameterisation features there are only three basic I/O modes.

- MODBUS Gateway (8 Byte)
- PROFIDRIVE PPO Type 1 (12 Byte)
- PROFIDRIVE PPO Type 3 (4 Byte)

Note : All words are stored in Big Endian format (i.e. High byte then Low byte)

5.1 MODBUS GATEWAY (8 BYTES)

The MODBUS Gateway mode is included here for backward compatibility with previous PROFIBUS products such as the Xtravert PROFIBUS interface (XPBi). Since the PROFIDRIVE PPO Type 1 has more features and also allows access to all drive parameters, the MODBUS Gateway mode is not recommended for new designs. For information on the use of the MODBUS Gateway mode please refer to the Xtravert PROFIBUS interface manual (PDL No. 4201-224) for descriptions and examples.

NOTE: The 'Autostop' feature is no longer supported. Use communications timeout as described in Section 1.

5.2 PPO TYPE 1 (12 BYTES)

The PROFIDRIVE defined Parameter Process Data Object (PPO) type 1 is made up of two parts, the Parameter data object and the Process data object. The Parameter data object is used to read and write the parameters within the drive and the Process data object transfers the control word and the speed reference to the drive and the status and actual speed words from the drive. A more detailed description of both these objects follows.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
Parameter Data Object								Process Data Object			
Parameter ID		Index		Parameter Value				Control/Status Word		Ref./Act. Speed Word	
See Table 5.6		High Byte	Low Byte	Highest Byte			Lowest Byte	High Byte	Low Byte	High Byte	Low Byte

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Table 5.1: PPO Type 1 Buffer layout

5.3 PPO TYPE 3 (4 BYTES)

The PROFIDRIVE defined Parameter Process Data Object (PPO) type 3 only contains the Process data object. The Process data object transfers the control and speed reference words to the drive and the status and actual speed words from the drive. A more detailed description of the Process data object follows.

Byte 0	Byte 1	Byte 2	Byte 3
Process Data Object			
Control / Status Word		Ref. / Act. Speed Word	
High Byte	Low Byte	High Byte	Low Byte

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Table 5.2: PPO Type 3 Buffer layout

5.4 PARAMETER DATA OBJECT

The Parameter data object allows all the variables within the drive to be accessed for read write purposes. This is achieved using a simple request response handshaking procedure where the current command must be acknowledged prior to a new one being written.

Referring back to the Parameter data object as shown in Table 5.1 we can see that this is made up of three main fields, the Parameter ID, the Index and the actual parameter value.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Function	RC				SPM	Parameter number										

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Table 5.3 Parameter ID Format

The Parameter ID field of PPO type 1 is broken down further into three fields.

The RC field is the reason / response code field. This determines if this is a read or write request to a parameter. Table 5.4 lists the supported Reason codes. In reply to the parameter request the RC field provides a Response code as listed in Table 5.5.

The SPM field is the spontaneous message field, these are not supported by the PBUS interface and should always be set to zero.

The parameter number is the internal address of the parameter you want to modify, Section 7 and Section 9 provide a complete list of the available parameters for the Elite and Xtravert series respectively.

The Index field of PPO type 1 is always zero as none of the PBUS interface parameters are stored in arrays.

The Parameter value field of PPO type 1 will be the required value in write requests or the actual value returned for read responses.

Reason	Function
0	No Request
1	Request parameter value (word)
2	Change parameter value (word)

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Table 5.4 Parameter ID Reason Codes

Response	Function
0	No Response
1	Transfer Parameter Value (word)
7	Request rejected

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Table 5.5 Parameter ID Response Codes

Error Code	Meaning
0	Illegal parameter number
2	Upper or Lower limit exceeded

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Table 5.6 Response Error Codes

Please refer to Appendix D for an example of how to use the Parameter data object.

5.5 PROCESS DATA OBJECT

Referring back to the Process data object as shown in Table 5.2 we can see that this is made up of two fields, the control and the reference speed words to the drive and the status and actual speed words from the drive.

The logical combination of the control word and external events produce control commands which act upon the internal state machine as shown in Fig. 5.1.

The following commands are implemented in the control word.

Bit	Value	Description
0	OFF1 = 0	Normal Ramp stop
1	OFF2 = 0	Spin Stop, the drive will perform a spin stop
2	OFF3 = 0	Fast Stop, the drive will decelerate at the Stop rate deceleration rate.
3	ENABLE = 1	Enable, the drive will ramp up / down as normal
7	RESET 0->1	Reset fault status, edge sensitive.

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Table 5.7 Control Word Bits

Note: OFF2 has the highest priority followed by OFF3 and then OFF1.

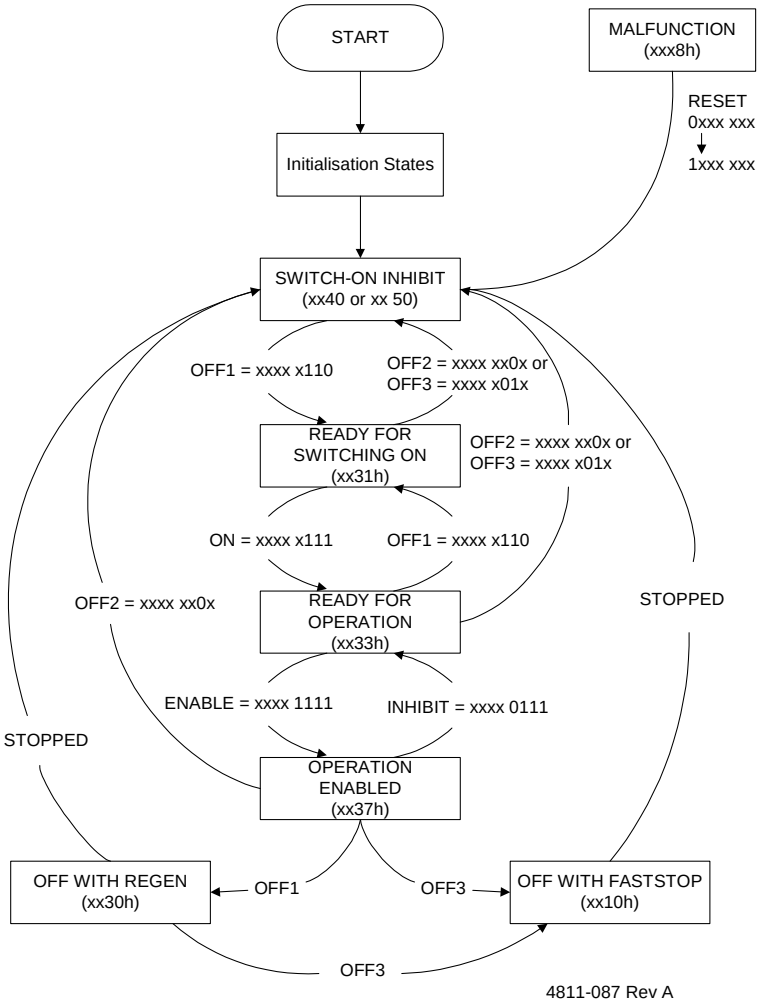

Fig. 5.1: PROFIDRIVE State Machine

The current state of the PROFIDRIVE state machine can always be determined by reading the Status register. Partial status information is shown in brackets inside each of the States in Fig. 5.1.

The following bits are implemented in the status word.

Bit	Description (Bit = 1)
0	Ready for switching on
1	Ready for operation, (control word bit 0)
2	Operation enabled, (control word bit 3)
3	Drive Faulted
4	OFF2 command NOT present
5	OFF3 command NOT present
6	Switch on Inhibit
7	Warning of impending trip
8	Not speed Limiting, the speed reference is not being limited
9	Remote control selected
10	At set speed

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Table 5.8 Status Word Bits

The reference / actual speed are in rpm.

Please refer to Appendix D for an example of how to use the Process data object.

SECTION 6: ELITE PARAMETER LISTING

All user adjustable parameters available within the Elite can be accessed over the parameter ID/Value channel of the Type 1 parameter process data object (PPO) as described in the PROFIDRIVE profile.

A more detailed explanation of the individual parameters follows.

Param	Screen	Description	Unit*Scale	Range
1	A1	Keyboard Control Mode	none	0..1
2	A2	Keyboard Torque Reference	%,(100%=8192)	-20480..+20480
3	A3	Keyboard Speed Reference	%,(100%=8192)	-20480..+20480
4	C1	Comparator 1 Select	none	0..18
5	C2	Comparator 1 On Setpoint	%,(100%=8192)	-20480..+20480
6	C3	Comparator 1 Off Setpoint	%,(100%=8192)	-20480..+20480
7	C4	Comparator 2 Select	none	0..18
8	C5	Comparator 2 On Setpoint	%,(100%=8192)	-20480..+20480
9	C6	Comparator 2 Off Setpoint	%,(100%=8192)	-20480..+20480
10	D1	Dynamic Brake Time Constant	s	0..250
11	D2	Dynamic Brake Duty Cycle	%,(100%=8192)	0..8192
12	F1	Fault History 1	none	0..39
13	F2	Fault History 2	none	0..39
14	F3	Fault History 3	none	0..39
15	F4	Fault History 4	none	0..39
16	F5	Fault History 5	none	0..39
17	F6	Clear Fault History	none	0..1
18	H2	Communications Timeout	none	0..3
19	I1	Local Start Stop	none	0..3
20	I2	Speed Reference Select	none	0..8
21	I3	Torque Reference Select	none	0..8
22	I4	Alternate Speed Ref Select	none	0..8
23	I5	Alternate Torque Ref Select	none	0..8
24	I6a	Analogue Input 1 Mode	none	0..3
25	I6b	Analogue Input 1 Low Setpoint	%,(100%=8192)	-32768..+32767
26	I6c	Analogue Input 1 High Setpoint	%,(100%=8192)	-32768..+32767
27	I6d	Analogue Input 2 Mode	none	0..3
28	I6e	Analogue Input 2 Low Setpoint	%,(100%=8192)	-32768..+32767
29	I6f	Analogue Input 2 High Setpoint	%,(100%=8192)	-32768..+32767
30	I6g	Zero Band	none	0..1
31	I7a	Multi-Function Input Mode	none	0..5
32	I7b	Multi-Function Input Polarity	none	0..1
33	I7c	Multi-Function Input 1 Select	none	0..18
34	I7d	Multi-Function Input 2 Select	none	0..18
35	I7e	Multi-Function Input 3 Select	none	0..18
36	I7f	Multi-Function Input 4 Select	none	0..18
37	I7g	Multi-Function Input 5 Select	none	0..18

38	I7h	Multi-Function Input 6 Select	none	0..18
39	I8a	Fibre Input Low Setpoint	%,(100%=8192)	-32768..+32767
40	I8b	Fibre Input High Setpoint	%,(100%=8192)	-32768..+32767
41	I8c	Fibre Optic Mode	none	0..5
42	I8d	Fibre Timeout	none	0..3
43	L2	Minimum Speed Limit	%,(100%=8192)	-20480..+20480
44	L3	Maximum Speed Limit	%,(100%=8192)	-20480..+20480
45	L4	Minimum Torque Limit	%,(100%=8192)	-32768..+32767
46	L5	Maximum Torque Limit	%,(100%=8192)	-32768..+32767
47	L6	Speed Limit Timeout	s x 1000	0..26000
48	L7	Torque Limit Timeout	s x 1000	0..26000
49	L8	Regeneration Limit	%,(100%=8192)	0..20480
50	L9	Current Limit	%,(100%=8192)	2048..12288
51	L10	Skip Speed 1	%,(100%=8192)	-20480..+20480
52	L11	Skip Speed 2	%,(100%=8192)	-20480..+20480
53	L12	Skip Bandwidth	%,(100%=8192)	0..1638
54	M1	Multi Reference Frequency 1	%,(100%=8192)	-32768..+32767
55	M2	Multi Reference Frequency 2	%,(100%=8192)	-32768..+32767
56	M3	Multi Reference Frequency 3	%,(100%=8192)	-32768..+32767
57	M4	Multi Reference Frequency 4	%,(100%=8192)	-32768..+32767
58	M5	Multi Reference Frequency 5	%,(100%=8192)	-32768..+32767
59	M6	Multi Reference Frequency 6	%,(100%=8192)	-32768..+32767
60	M7	Multi Reference Frequency 7	%,(100%=8192)	-32768..+32767
61	N1	Motor Rated Current	%,(100%=8192)	1639..12288
62	N2	Motor Rated Volts	Volts	0..999
63	N3	Motor Rated Frequency	Hz	25..400
64	N4	Motor Rated Power	kW * 100	0..65000
65	N5	Motor Rated Speed	rpm	0..24000
66	N6	Motor Rated Cooling	%,(100%=8192)	1638..8273
67	N8	Encoder PPR	ppr	0..8191
68	N9	Encoder Type	none	0..1
69	O1a	Analogue Output 1 Select	none	0..19
70	O1b	Analogue Output 1 Mode	none	0..3
71	O1c	Analogue Output 1 Low	%,(100%=8192)	-32768..+32767
72	O1d	Analogue Output 1 High	%,(100%=8192)	-32768..+32767
73	O1e	Analogue Output 2 Select	none	0..19
74	O1f	Analogue Output 2 Mode	none	0..3
75	O1g	Analogue Output 2 Low	%,(100%=8192)	-32768..+32767
76	O1h	Analogue Output 2 High	%,(100%=8192)	-32768..+32767
77	O2a	Relay 1 Select	none	0..23
78	O2b	Relay 1 Invert	none	0..1
79	O2c	Relay 2 Select	none	0..23
80	O2d	Relay 2 Invert	none	0..1
81	O2e	Relay 3 Select	none	0..23
82	O2f	Relay 3 Invert	none	0..1
83	O3a	Fibre Output Select	none	0..19

84	P1	Process Reference Select	none	0..7
85	P2	Process Feedback Select	none	0..4
86	P3	Process Kc	none	1..100
87	P4	Process Ti	s x 10	10..10010
88	P5	Process Td	s x 10	0..2500
89	R1	Acceleration Rate	%/s * 10	1..65000
90	R2	Deceleration Rate	%/s * 10	1..65000
91	R3	Alternative Acceleration Rate	%/s * 10	1..65000
92	R4	Alternative Deceleration Rate	%/s * 10	1..65000
93	R5	Break Speed	%,(100%=8192)	0..20480
94	R6	StopRate Deceleration Rate	%/s * 10	1..65000
95	R7	Speed Filter	s(100%/s)*1000	0..60000
96	R8	Torque Filter	s * 1000	0..10000
97	S1	Start Mode	none	0..1
98	S2	Stop Mode	none	0..5
99	S4	Alternative Stop Mode	none	0..5
100	S5	Start Delay Time	s * 1000	0..1000
101	S6	Off Delay Time	s * 1000	0..36000
102	S7	Low Voltage Trip	none	0..1
103	S8	DC Brake Level	%,(100%=8192)	0..12288
104	X1	Control Type	none	0..2
105	X2	Autotune	none	0..1
106	X3a	Lm	%,(100%=8192)	3276..65535
107	X3b	Rs	%,(100%=8192)	0..1228
108	X3c	Rr	%,(100%=8192)	0..1228
109	X3d	Sigma	%,(100%=8192)	0..1638
110	X3e	Field Weakening Point	%,(100%=8192)	4096..8192
111	X4a	Minimum Flux Level	%,(100%=8192)	3277..8192
112	X4b	Autoboost	none	0..2
113	X4c	Start Torque	%,(100%=8192)	0..20480
114	X4d	Start Band	%,(100%=8192)	0..8192
115	X4f	Kp w	%,(100%=8192)	0..24576
116	X4g	Ki w	none	0..4096
117	X4h	Kd w	none	0..4096
118	X5a	Current Limit Slip	%,(100%=8192)	0..901
119	X5b	Voltage Limit Slip	%,(100%=8192)	0..1638
120	X5c	Damping	%,(100%=8192)	0..1638
121	X5d	Slip Compensation	none	0..1
122	X5e	Whisperwave	none	0..1
123	X5f	Switching Frequency	Hz	3999..16000
124	X5g	Kp I	%,(100%=8192)	0..8192
125	X5h	Ki I	%,(100%=8192)	0..8192
126	X5i	Kf w	%,(100%=8192)	245..8192
127	Y1	Language Selection	none	0..255
128		Status display	none	0..59
129		Output Speed	%,(100%=8192)	-32768..+32767

130		Output Torque	%,(100%=8192)	-32768..+32767
131	A8	DC Bus Voltage	%,(100%=8192)	0..65535
132	A6	Output Current	%,(100%=8192)	0..65535
133		Encoder Speed	none	-32768..+32767
134	F, F1..F6	Fault State	none	0..39
135	A7	Motor Temperature	%,(100%=8192)	0..65535
136	A7	Inverter Temperature	%,(100%=8192)	0..65535
137		Dynamic Brake Temperature	%,(100%=8192)	0..65535
138		Heatsink Temperature	‘C	-50..+100
139		Internal Temperature	‘C	-50..+100
140		Fibre Reference Input	%,(100%=8192)	-32768..+32767
141		Fibre Reference Output	%,(100%=8192)	-32768..+32767
142	Z3	Analogue Input 1	%,(100%=8192)	-32768..+32767
143	Z4	Analogue Input 2	%,(100%=8192)	-32768..+32767
144	Z5	Analogue Output 1	%,(100%=8192)	-32768..+32767
145	Z6	Analogue Output 2	%,(100%=8192)	-32768..+32767
146		Analogue Input 1+2	%,(100%=8192)	-32768..+32767
147	Z2	Software Version	Version*10	0..255
148	Z2	Hardware Version	Version*10	0..255
149	A4	Reference Speed	%,(100%=8192)	-32768..+32767
150	A4	Reference Torque	%,(100%=8192)	-32768..+32767
151	Z7	Multifunction Input 1	none	0..1
152	Z7	Multifunction Input 2	none	0..1
153	Z7	Multifunction Input 3	none	0..1
154	Z7	Multifunction Input 4	none	0..1
155	Z7	Multifunction Input 5	none	0..1
156	Z7	Multifunction Input 6	none	0..1
157	P6	Process Error	%,(100%=8192)	-32768..+32767
158		Process Enable	none	0..1
159		Process Reference	none	-32768..+32767
160		Process Feedback	none	-32768..+32767
161		Drive ID	none	0..65535
162		Comparator 1 Output	none	0..1
163		Multi Ref Select	none	0..255
164		Motorised Pot Speed	%,(100%=8192)	-32768..+32767
165		Motorised Pot Torque	%,(100%=8192)	-32768..+32767
166		Status Overload	none	0..3
167		Comparator 2 Output	none	0..1
168		Window Comparator	none	0..1
169	A5	Power Out	%,(100%=8192)	-32768..+32767
170	A8	Output Voltage	%,(100%=8192)	0..65535
171		Drive Rated Current	Amps x 10	0..65535

SECTION 7: ELITE PARAMETER DESCRIPTIONS

To reduce the size of the parameter listing the following abbreviations have been used:

Access: R Read access only to this parameter
R/W Read and write access to this parameter

Description: **Keyboard Control Mode** **Elite Screen: A1**
Parameter: 1 Access: R/W Range: 0..1
Special Values: 0 = Speed mode
1 = Torque mode

Description: **Keyboard Torque Reference** **Elite Screen: A2**
Parameter: 2 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is rated output Torque of motor

Description: **Keyboard Speed Reference** **Elite Screen: A3**
Parameter: 3 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Comparator 1 Select** **Elite Screen: C1**
Parameter: 4 Access: R/W Range: 0..18
Special Values: 0 = No source selected
1 = 100% of full scale
2 = Output Current
3 = Output Volts
4 = Bus Voltage
5 = Motor Power
6 = Motor Speed
7 = Motor Torque
8 = Reference Speed
9 = Reference Torque
10 = Motor Temperature
11 = Inverter Temperature
12 = Analogue Input 1 Echo
13 = Analogue Input 2 Echo
14 = Analogue Input 1+2 Echo
15 = Fibre Echo
16 = Process Reference
17 = Process Feedback
18 = Process Error

Notes: Comparator 1 is turned “ON” if source > Comparator 1 “ON” setpoint.
Comparator 1 is turned “OFF” if source <= Comparator 1 “OFF” setpoint.

Description: **Comparator 1 On Setpoint** **Elite Screen:** **C2**
Parameter: 5 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is that of source selected
Notes: Valid values are from Comp 1 OFF to +250%

Description: **Comparator 1 Off Setpoint** **Elite Screen:** **C3**
Parameter: 6 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Comparator 2 Select** **Elite Screen:** **C4**
Parameter: 7 Access: R/W Range: 0..18
Special Values: See Comparator 1 Select above for enumeration list
Notes: Comparator 2 is turned “ON” if source > Comparator 2 “ON” setpoint.
Comparator 2 is turned “OFF” if source <= Comparator 2 “OFF” setpoint

Description: **Comparator 2 On Setpoint** **Elite Screen:** **C5**
Parameter: 8 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is that of source selected
Notes: Valid values are from Comp 2 Off to +250%.

Description: **Comparator 2 Off Setpoint** **Elite Screen:** **C6**
Parameter: 9 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is that of source selected
Notes: Valid values are from -250% to Comp 2 ON.

Description: **Dynamic Brake Time Constant** **Elite Screen:** **D1**
Parameter: 10 Access: R/W Range: 0..250
Units * Scale: s

Description: **Dynamic Brake Duty Cycle** **Elite Screen:** **D2**
Parameter: 11 Access: R/W Range: 0..8192
Units * Scale: %, (100% = 8192)

Description: **Fault History 1** **Elite Screen:** **F1**
Parameter: 12 Access: R Range: 0..39
Special Values: 0 = No Faults
1 = Low DC bus voltage
2 = High DC bus voltage
3 = High DC bus voltage timeout
4 = Input supply phase voltage imbalance
5 = Software download fault
6 = EEPROM fault
7 = Current limit fault
8 = +ve U-phase IGBT desaturation
9 = +ve V-phase IGBT desaturation
10 = +ve W-phase IGBT desaturation
11 = -ve U-phase IGBT desaturation
12 = -ve V-phase IGBT desaturation
13 = -ve W-phase IGBT desaturation

14 = -ve phase IGBT desaturation (on smaller Elites)
15 = Inverter thermal model overload trip
16 = Motor thermal model overload trip
17 = Dynamic brake resistor thermal model overload trip
18 = EEPROM reading fault
19 = Zero nameplate parameter detected
20 = Inconsistent nameplate parameters detected
21 = Excessive current flow to ground
22 = External/PTC trip
23 = Excessive heatsink temperature trip
24 = Excessive internal temperature trip
25 = Host computer generated trip
26 = Time since last serial comms exceeds timeout period
27 = Time since last F/O comms exceeds T/O period
28 = Maximum output speed exceeded
29 = Torque limit timeout
30 = Speed limit timeout
31 = Calibration fault
32 = Software timeout fault
33 = Low voltage dc supply fault
34 = Vista generated trip
35 = Elite display disconnected
36 = Undetermined fault detected by EPLD
37 = Watchdog trip
38 = No Vista configuration loaded
39 = Trip detected on fibre-optic control network

Description: **Fault History 2** **Elite Screen:** **F2**
Parameter: 13 Access: R Range: 0..39
Special Values: See Fault History 1 above for enumeration list.

Description: **Fault History 3** **Elite Screen:** **F3**
Parameter: 14 Access: R Range: 0..39
Special Values: See Fault History 1 above for enumeration list.

Description: **Fault History 4** **Elite Screen:** **F4**
Parameter: 15 Access: R Range: 0..39
Special Values: See Fault History 1 above for enumeration list.

Description: **Fault History 5** **Elite Screen:** **F5**
Parameter: 16 Access: R Range: 0..39
Special Values: See Fault History 1 above for enumeration list.

Description: **Clear Fault History** **Elite Screen:** **F6**
Parameter: 17 Access: R/W Range: 0..1
Special Values: 0 = No
1 = Yes

Description: **Communications Timeout** **Elite Screen:** **H2**
Parameter: 18 Access: R/W Range: 0..3

Special Values: 0 = 1 second timeout
1 = 5 second timeout
2 = 25 second timeout
3 = No timeout

Description: **Local Start Stop** **Elite Screen:** **I1**
Parameter: 19 Access: R/W Range: 0..3
Special Values: 0 = No local control
1 = Reset only
2 = Stop-Reset
3 = Start/Stop-Reset

Description: **Speed Reference Select** **Elite Screen:** **I2**
Parameter: 20 Access: R/W Range: 0..8
Special Values: 0 = No source selected
1 = Analogue Input 1
2 = Analogue Input 2
3 = Sum of Analogue Inputs 1 + 2
4 = Fibre-optic in/out
5 = Keyboard speed control
6 = Multi-reference
7 = Motorised potentiometer SP
8 = Process Controller
Notes: Speed Ref Select can only be modified when the Elite is OFF.

Description: **Torque Reference Select** **Elite Screen:** **I3**
Parameter: 21 Access: R/W Range: 0..8
Special Values: 0 = No source selected
1 = Analogue Input 1
2 = Analogue Input 2
3 = Sum of Analogue Inputs 1 + 2
4 = Fibre-optic in/out
5 = Keyboard torque control
6 = Multi-reference input
7 = Motorised potentiometer TQ
8 = Process Controller
Notes: Torque Ref Select can only be modified when the Elite is OFF.

Description: **Alternate Speed Ref Select** **Elite Screen:** **I4**
Parameter: 22 Access: R/W Range: 0..8
Special Values: See Speed Reference Select above for enumeration list.
Notes: Alt Speed Select can only be modified when the Elite is OFF.

Description: **Alternate Torque Ref Select** **Elite Screen:** **I5**
Parameter: 23 Access: R/W Range: 0..8
Special Values: See Torque Reference Select above for enumeration list.
Notes: Alt Torque Select can only be modified when the Elite is OFF.

Description: **Analogue Input 1 Mode** **Elite Screen:** **I6a**
Parameter: 24 Access: R/W Range: 0..3
Special Values: 0 = 0 to10 Vdc
1 = -10 to +10 Vdc
2 = 4 to 20 mA
3 = 0 to 20 mA
Notes: Analogue I/P 1 Mode can only be modified when the Elite is OFF.

Description: **Analogue Input 1 Low Setpoint** **Elite Screen:** **I6b**
Parameter: 25 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Analogue Input 1 High Setpoint** **Elite Screen:** **I6c**
Parameter: 26 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Analogue Input 2 Mode** **Elite Screen:** **I6d**
Parameter: 27 Access: R/W Range: 0..3
Special Values: 0 = 0 to10 Vdc
1 = -10 to +10 Vdc
2 = 4 to 20 mA
3 = 0 to 20 mA
Notes: Analogue I/P 2 Mode can only be modified when the Elite is OFF.

Description: **Analogue Input 2 Low Setpoint** **Elite Screen:** **I6e**
Parameter: 28 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Analogue Input 2 High Setpoint** **Elite Screen:** **I6f**
Parameter: 29 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Zero Band** **Elite Screen:** **I6g**
Parameter: 30 Access: R/W Range: 0..1
Special Values: 0 = No Zero Band
1 = Zero Band On

Description: **Multi-Function Input Mode** **Elite Screen:** **I7a**
Parameter: 31 Access: R/W Range: 0..5
Special Values: 0 = Disable Inputs
1 = Standard 3-wire control
2 = All Programmable
3 = Multi-reference 2 Wire
4 = Multi-reference 3 Wire
5 = Motorised Potentiometer
Notes: I/P Mode can only be modified when the Elite is OFF.

Description: **Multi-Function Input Polarity** **Elite Screen:** **I7b**
Parameter: 32 Access: R/W Range: 0..1
Special Values: 0 = Active low

1 = Active high

Notes: I/P Polarity can only be modified when the Elite is OFF.

Description: **Multi-Function Input 1 Select** **Elite Screen:** **I7c**
Parameter: 33 Access: R/W Range: 0..18
Special Values: 0 = Unused
1 = Start
2 = Stop
3 = Alternative Stop
4 = Stop-Reset
5 = Start/Stop
6 = Stop/Start-Reset
7 = Reset
8 = Inch 1
9 = Inch 2
10 = Invert Speed Reference
11 = Invert Torque Reference
12 = Invert Torque/Speed Reference
13 = Invert Inch
14 = Alternative Accel/Decel Rate
15 = Alternative Reference
16 = Speed/Torque Mode
17 = Process Enable
18 = Start/Stop-Reset
Notes: MFI 1 Select can only be modified when the Elite is OFF.

Description: **Multi-Function Input 2 Select** **Elite Screen:** **I7d**
Parameter: 34 Access: R/W Range: 0..18
Special Values: See Multi-Function Input 1 Select above for enumeration list.
Notes: MFI 2 Select can only be modified when the Elite is OFF.

Description: **Multi-Function Input 3 Select** **Elite Screen:** **I7e**
Parameter: 35 Access: R/W Range: 0..18
Special Values: See Multi-Function Input 1 Select above for enumeration list.
Notes: MFI 3 Select can only be modified when the Elite is OFF.

Description: **Multi-Function Input 4 Select** **Elite Screen:** **I7f**
Parameter: 36 Access: R/W Range: 0..18
Special Values: See Multi-Function Input 1 Select above for enumeration list.
Notes: MFI 4 Select can only be modified when the Elite is OFF.

Description: **Multi-Function Input 5 Select** **Elite Screen:** **I7g**
Parameter: 37 Access: R/W Range: 0..18
Special Values: See Multi-Function Input 1 Select above for enumeration list.
Notes: MFI 5 Select can only be modified when the Elite is OFF.

Description: **Multi-Function Input 6 Select** **Elite Screen:** **I7h**
Parameter: 38 Access: R/W Range: 0..18
Special Values: See Multi-Function Input 1 Select above for enumeration list.
Notes: MFI 6 Select can only be modified when the Elite is OFF.

Description: **Fibre Input Low Setpoint** **Elite Screen:** **I8a**
Parameter: 39 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Fibre Input High Setpoint** **Elite Screen:** **I8b**
Parameter: 40 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Fibre Optic Mode** **Elite Screen:** **I8c**
Parameter: 41 Access: R/W Range: 0..5
Special Values: 0 = No Control
1 = Master Control
2 = Full slave control
3 = Slave - trip/reset cntrl only
4 = Slave - run cntrl only
5 = Slave - run cntrl, stop on trip
Notes: Fibre Mode can only be modified when the Elite is OFF. Used to select the way the Elite responds to the control word circulating on the fibre-optic control network. Refer General Application Note PDL Document No. 4216-045 for a full explanation.

Description: **Fibre Timeout** **Elite Screen:** **I8d**
Parameter: 42 Access: R/W Range: 0..3
Special Values: 0 = 1 second timeout
1 = 5 second timeout
2 = 25 second timeout
3 = Disable timeout
Notes: Fibre Timeout can only be modified when the Elite is OFF.

Description: **Minimum Speed Limit** **Elite Screen:** **L2**
Parameter: 43 Access: R/W Range: -20480..+20480
Units * Scale: %, Note: 100% = 8192 Base is rated synchronous speed of motor in rpm
Notes: Valid values are from -250% to Max Speed Limit.

Description: **Maximum Speed Limit** **Elite Screen:** **L3**
Parameter: 44 Access: R/W Range: -20480..+20480
Units * Scale: %, Note: 100% = 8192 Base is rated synchronous speed of motor in rpm
Notes: Valid values are from Min Speed Limit to +250%.

Description: **Minimum Torque Limit** **Elite Screen:** **L4**
Parameter: 45 Access: R/W Range: -32768..+32767
Units * Scale: %, Note: 100% = 8192 Base is rated output Torque of motor
Notes: Valid values are from -250% to Max Torque Limit.

Description: **Maximum Torque Limit** **Elite Screen:** **L5**
Parameter: 46 Access: R/W Range: -32768..+32767
Units * Scale: %, Note: 100% = 8192 Base is rated output Torque of motor
Notes: Valid values are from Min Speed Torque to +250%.

Description: **Speed Limit Timeout** **Elite Screen:** **L6**
Parameter: 47 Access: R/W Range: 0..26000
Units * Scale: s x 1000

Description: **Torque Limit Timeout** **Elite Screen:** **L7**
Parameter: 48 Access: R/W Range: 0..26000
Units * Scale: s x 1000

Description: **Regeneration Limit** **Elite Screen:** **L8**
Parameter: 49 Access: R/W Range: 0..20480
Units * Scale: %, (100% = 8192) Base is rated power of motor (screen N4)

Description: **Current Limit** **Elite Screen:** **L9**
Parameter: 50 Access: R/W Range: 2048..12288
Units * Scale: %, (100% = 8192) Base is rated drive current ie. 2.5 Amps

Description: **Skip Speed 1** **Elite Screen:** **L10**
Parameter: 51 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Skip Speed 2** **Elite Screen:** **L11**
Parameter: 52 Access: R/W Range: -20480..+20480
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Skip Bandwidth** **Elite Screen:** **L12**
Parameter: 53 Access: R/W Range: 0..1638
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Multi Reference Frequency 1** **Elite Screen:** **M1**
Parameter: 54 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 2** **Elite Screen:** **M2**
Parameter: 55 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 3** **Elite Screen:** **M3**
Parameter: 56 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 4** **Elite Screen:** **M4**
Parameter: 57 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 5** **Elite Screen:** **M5**
Parameter: 58 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 6** **Elite Screen:** **M6**
Parameter: 59 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Multi Reference Frequency 7** **Elite Screen:** **M7**
Parameter: 60 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is Rated Motor Speed or Torque

Description: **Motor Rated Current** **Elite Screen:** **N1**
Parameter: 61 Access: R/W Range: 1639..12288
Units * Scale: %, (100% = 8192) Base is rated drive current ie. 2.5 Amps

Description: **Motor Rated Volts** **Elite Screen:** **N2**
Parameter: 62 Access: R/W Range: 0..999
Units * Scale: Volts

Description: **Motor Rated Frequency** **Elite Screen:** **N3**
Parameter: 63 Access: R/W Range: 25..400
Units * Scale: Hz

Description: **Motor Rated Power** **Elite Screen:** **N4**
Parameter: 64 Access: R/W Range: 0..65000
Units * Scale: kW * 100

Description: **Motor Rated Speed** **Elite Screen:** **N5**
Parameter: 65 Access: R/W Range: 0..24000
Units * Scale: rpm

Description: **Motor Rated Cooling** **Elite Screen:** **N6**
Parameter: 66 Access: R/W Range: 1638..8273
Units * Scale: %, (100% = 8192)

Description: **Encoder PPR** **Elite Screen:** **N8**
Parameter: 67 Access: R/W Range: 0..8191
Units * Scale: ppr

Description: **Encoder Type** **Elite Screen:** **N9**
Parameter: 68 Access: R/W Range: 0..1
Special Values: 0 = Differential encoder
1 = Single-ended encoder
Notes: Encoder Type can only be modified when the Elite is OFF.

Description: **Analogue Output 1 Select** **Elite Screen:** **O1a**
Parameter: 69 Access: R/W Range: 0..19
Special Values: 0 = No source selected

1 = 100% of full scale
2 = Output Current
3 = Output Volts
4 = Bus Voltage
5 = Motor Power
6 = Motor Speed
7 = Motor Torque
8 = Reference Speed
9 = Reference Torque
10 = Motor Temperature
11 = Inverter Temperature
12 = Analogue Input 1 Echo
13 = Analogue Input 2 Echo
14 = Analogue Input 1+2 Echo
15 = Fibre Echo
16 = Process Reference
17 = Process Feedback
18 = Process Error
19 = Vista Controlled

Description: **Analogue Output 1 Mode** **Elite Screen: O1b**
Parameter: 70 Access: R/W Range: 0..3
Special Values: 0 = 0 to10 Vdc
1 = -10 to +10 Vdc
2 = 4 to 20 mA
3 = 0 to 20 mA
Notes: Analogue O/P 1 Mode can only be modified when the Elite is OFF.

Description: **Analogue Output 1 Low** **Elite Screen: O1c**
Parameter: 71 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Output 1 High** **Elite Screen: O1d**
Parameter: 72 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Output 2 Select** **Elite Screen: O1e**
Parameter: 73 Access: R/W Range: 0..19
Special Values: See Analogue Output 1 Select above for enumeration list.

Description: **Analogue Output 2 Mode** **Elite Screen: O1f**
Parameter: 74 Access: R/W Range: 0..3
Special Values: 0 = 0 to10 Vdc
1 = -10 to +10 Vdc
2 = 4 to 20 mA
3 = 0 to 20 mA
Notes: Analogue O/P 2 Mode can only be modified when the Elite is OFF.

Description: **Analogue Output 2 Low** **Elite Screen: O1g**
Parameter: 75 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Output 2 High** **Elite Screen: O1h**
Parameter: 76 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Relay 1 Select** **Elite Screen: O2a**
Parameter: 77 Access: R/W Range: 0..23
Special Values:
0 = Always Off
1 = Always On
2 = No Faults
3 = Drive Fault
4 = Supply Fault
5 = Overload Fault
6 = Overload Warning
7 = Start
8 = Run
9 = Zero Speed
10 = At Set Speed
11 = Torque Sign
12 = Speed Sign
13 = Torque Reference Sign
14 = Speed Reference Sign
15 = Speed Limit
16 = Torquee Limit
17 = Voltage Limit
18 = Current Limit
19 = Comparator 1
20 = Comparator 2
21 = Window Comparator
22 = Brake Release
23 = Vista Control

Description: **Relay 1 Invert** **Elite Screen: O2b**
Parameter: 78 Access: R/W Range: 0..1
Special Values:
0 = Relay logic Not inverted
1 = Relay logic inverted

Description: **Relay 2 Select** **Elite Screen: O2c**
Parameter: 79 Access: R/W Range: 0..23
Special Values: See Relay 1 Select above for enumeration list.

Description: **Relay 2 Invert** **Elite Screen: O2d**
Parameter: 80 Access: R/W Range: 0..1
Special Values:
0 = Relay logic Not inverted
1 = Relay logic inverted

Description: **Relay 3 Select** **Elite Screen:** **O2e**
Parameter: 81 Access: R/W Range: 0..23
Special Values: See Relay 1 Select above for enumeration list.

Description: **Relay 3 Invert** **Elite Screen:** **O2f**
Parameter: 82 Access: R/W Range: 0..1
Special Values: 0 = Relay logic Not inverted
1 = Relay logic inverted

Description: **Fibre Output Select** **Elite Screen:** **O3a**
Parameter: 83 Access: R/W Range: 0..19
Special Values: See Analogue Output 1 Select above for enumeration list.

Description: **Process Reference Select** **Elite Screen:** **P1**
Parameter: 84 Access: R/W Range: 0..7
Special Values: 0 = No source selected
1 = Analogue Input 1
2 = Analogue Input 2
3 = Sum of Analogue Inputs 1 + 2
4 = Fibre-optic in/out
5 = Keyboard torque control
6 = Multi-reference input
7 = Motorised potentiometer

Description: **Process Feedback Select** **Elite Screen:** **P2**
Parameter: 85 Access: R/W Range: 0..4
Special Values: 0 = No source selected
1 = Analogue Input 1
2 = Analogue Input 2
3 = Sum of Analogue Inputs 1 + 2
4 = Fibre-optic Input

Description: **Process Kc** **Elite Screen:** **P3**
Parameter: 86 Access: R/W Range: 1..100

Description: **Process Ti** **Elite Screen:** **P4**
Parameter: 87 Access: R/W Range: 10..10010
Units * Scale: s x 10

Description: **Process Td** **Elite Screen:** **P5**
Parameter: 88 Access: R/W Range: 0..2500
Units * Scale: s x 10

Description: **Acceleration Rate** **Elite Screen:** **R1**
Parameter: 89 Access: R/W Range: 1..65000
Units * Scale: %/s * 10

Description: **Deceleration Rate** **Elite Screen:** **R2**
Parameter: 90 Access: R/W Range: 1..65000
Units * Scale: %/s * 10

Description: **Alternative Acceleration Rate** **Elite Screen:** **R3**
Parameter: 91 Access: R/W Range: 1..65000
Units * Scale: %/s * 10

Description: **Alternative Deceleration Rate** **Elite Screen:** **R4**
Parameter: 92 Access: R/W Range: 1..65000
Units * Scale: %/s * 10

Description: **Break Speed** **Elite Screen:** **R5**
Parameter: 93 Access: R/W Range: 0..20480
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **StopRate Deceleration Rate** **Elite Screen:** **R6**
Parameter: 94 Access: R/W Range: 1..65000
Units * Scale: %/s * 10

Description: **Speed Filter** **Elite Screen:** **R7**
Parameter: 95 Access: R/W Range: 0..60000
Units * Scale: s(100%/s)*1000

Description: **Torque Filter** **Elite Screen:** **R8**
Parameter: 96 Access: R/W Range: 0..10000
Units * Scale: s * 1000

Description: **Start Mode** **Elite Screen:** **S1**
Parameter: 97 Access: R/W Range: 0..1
Special Values: 0 = Normal start
1 = Spin start

Description: **Stop Mode** **Elite Screen:** **S2**
Parameter: 98 Access: R/W Range: 0..5
Special Values: 0 = Normal
1 = Ramp stop
2 = Spin stop
3 = Stop-Rate stop
4 = Off-stop
5 = DC braking

Description: **Alternative Stop Mode** **Elite Screen:** **S4**
Parameter: 99 Access: R/W Range: 0..5
Special Values: 0 = Normal
1 = Ramp stop
2 = Spin stop
3 = Stop-Rate stop
4 = Off-stop
5 = DC braking

Description: **Start Delay Time** **Elite Screen:** **S5**
Parameter: 100 Access: R/W Range: 0..1000
Units * Scale: s * 1000

Description: **Off Delay Time** **Elite Screen:** **S6**
Parameter: 101 Access: R/W Range: 0..36000
Units * Scale: s * 1000

Description: **Low Voltage Trip** **Elite Screen:** **S7**
Parameter: 102 Access: R/W Range: 0..1
Special Values: 0 = Disable trip on Low Bus Volts
1 = Trip on Low BusVolts

Description: **DC Brake Level** **Elite Screen:** **S8**
Parameter: 103 Access: R/W Range: 0..12288
Units * Scale: %, (100% = 8192)

Description: **Control Type** **Elite Screen:** **X1**
Parameter: 104 Access: R/W Range: 0..2
Special Values: 0 = Open loop vector
1 = Closed loop vector
2 = V/Hz
Notes: Control Type can only be selected when the Elite is OFF.

Description: **Autotune** **Elite Screen:** **X2**
Parameter: 105 Access: R/W Range: 0..1
Special Values: 0 = No
1 = Autotune motor
Notes: Request to autotune the motor can only be requested when the Elite is OFF and no stop active

Description: **Lm** **Elite Screen:** **X3a**
Parameter: 106 Access: R/W Range: 3276..65535
Units * Scale: %, (100% = 8192) Base is base ohms

Description: **Rs** **Elite Screen:** **X3b**
Parameter: 107 Access: R/W Range: 0..1228
Units * Scale: %, (100% = 8192) Base is base ohms

Description: **Rr** **Elite Screen:** **X3c**
Parameter: 108 Access: R/W Range: 0..1228
Units * Scale: %, (100% = 8192) Base is base ohms

Description: **Sigma** **Elite Screen:** **X3d**
Parameter: 109 Access: R/W Range: 0..1638
Units * Scale: %, (100% = 8192)

Description: **Field Weakening Point** **Elite Screen:** **X3e**
Parameter: 110 Access: R/W Range: 4096..8192
Units * Scale: %, (100% = 8192)

Description: **Minimum Flux Level** **Elite Screen:** **X4a**
Parameter: 111 Access: R/W Range: 3277..8192
Units * Scale: %, (100% = 8192)

Description: **Autoboost** **Elite Screen:** **X4b**
Parameter: 112 Access: R/W Range: 0..2
Special Values: 0 = Fixed voltage boost
1 = Auto voltage boost
2 = Controlled current boost

Description: **Start Torque** **Elite Screen:** **X4c**
Parameter: 113 Access: R/W Range: 0..20480
Units * Scale: %, (100% = 8192)
Notes: Only used in V/Hz and Open Loop Vector control types

Description: **Start Band** **Elite Screen:** **X4d**
Parameter: 114 Access: R/W Range: 0..8192
Units * Scale: %, Note: 100% = 8192 (Base is: Rated motor frequency ie. 50 Hz)

Description: **Kp w** **Elite Screen:** **X4f**
Parameter: 115 Access: R/W Range: 0..24576
Units * Scale: %, (100% = 8192)

Description: **Ki w** **Elite Screen:** **X4g**
Parameter: 116 Access: R/W Range: 0..4096

Description: **Kd w** **Elite Screen:** **X4h**
Parameter: 117 Access: R/W Range: 0..4096

Description: **Current Limit Slip** **Elite Screen:** **X5a**
Parameter: 118 Access: R/W Range: 0..901
Units * Scale: %, (100% = 8192)

Description: **Voltage Limit Slip** **Elite Screen:** **X5b**
Parameter: 119 Access: R/W Range: 0..1638
Units * Scale: %, (100% = 8192)

Description: **Damping** **Elite Screen:** **X5c**
Parameter: 120 Access: R/W Range: 0..1638
Units * Scale: %, (100% = 8192)

Description: **Slip Compensation** **Elite Screen:** **X5d**
Parameter: 121 Access: R/W Range: 0..1
Units * Scale: none

Description: **Whisperwave** **Elite Screen:** **X5e**
Parameter: 122 Access: R/W Range: 0..1
Special Values: 0 = Narrowband
1 = Whisper Wave

Description: **Switching Frequency** **Elite Screen:** **X5f**
Parameter: 123 Access: R/W Range: 3999..16000
Units * Scale: Hz

Description: **Kp I** **Elite Screen:** **X5g**
Parameter: 124 Access: R/W Range: 0..8192
Units * Scale: %, (100% = 8192)

Description: **Ki I** **Elite Screen:** **X5h**
Parameter: 125 Access: R/W Range: 0..8192
Units * Scale: %, (100% = 8192)

Description: **Kf w** **Elite Screen:** **X5i**
Parameter: 126 Access: R/W Range: 245..8192
Units * Scale: %, (100% = 8192)

Description: **Language Selection** **Elite Screen:** **Y1**
Parameter: 127 Access: R/W Range: 0..255
Special Values: 0 = ENGLISH
1 = DEUTSCH

Description: **Status display** **Elite Screen:** **-**
Parameter: 128 Access: R Range: 0..59
Special Values: 0 = Drive off
1 = Drive running
2 = Drive running
3 = Drive running
4 = Drive stopped
5 = Drive stopping
6 = Drive current limiting
7 = Drive voltage limiting
8 = Drive speed limiting
9 = Drive torque limiting
10 = Drive inching
11 = Drive ready
12 = Autotuning motor
13 = Drive stopping
21-59 = F1-F39 Drive has tripped on fault displayed

Description: **Output Speed** **Elite Screen:** **-**
Parameter: 129 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Output Torque** **Elite Screen:** **-**
Parameter: 130 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated output Torque of motor

Description: **DC Bus Voltage** **Elite Screen:** **A8**
Parameter: 131 Access: R Range: 0..65535
Units * Scale: %, (100% = 8192) Base is Motor voltage * sqrt(2)

Description: **Output Current** **Elite Screen: A6**
Parameter: 132 Access: R Range: 0..65535
Units * Scale: %, (100% = 8192) Base is peak rated drive current ie 2.5Amps * sqrt(2)

Description: **Encoder Speed** **Elite Screen: -**
Parameter: 133 Access: R Range: -32768..+32767

Description: **Fault State** **Elite Screen:F, F1..F6**
Parameter: 134 Access: R Range: 0..39
Special Values:
0 = No Faults
1 = Low DC bus voltage
2 = High DC bus voltage
3 = High DC bus voltage timeout
4 = Supply phase voltage imbalance
5 = Software download fault
6 = EEPROM fault
7 = Current limit fault
8 = +ve U-phase IGBT desaturation
9 = +ve V-phase IGBT desaturation
10 = +ve W-phase IGBT desaturation
11 = -ve U-phase IGBT desaturation
12 = -ve V-phase IGBT desaturation
13 = -ve W-phase IGBT desaturation
14 = -ve phase IGBT desaturation
15 = Inverter thermal model trip
16 = Motor thermal model trip
17 = D-Brake thermal model trip
18 = EEPROM reading fault
19 = Zero nameplate data
20 = Inconsistent nameplate data
21 = Excessive earth current
22 = External/PTC trip
23 = Heatsink temperature trip
24 = Internal temperature trip
25 = Host computer generated trip
26 = Serial communications Time-out
27 = Fibre communications Time-out
28 = Maximum output speed exceeded
29 = Torque limit timeout
30 = Speed limit timeout
31 = Calibration fault
32 = Software timeout fault
33 = Low voltage dc supply fault
34 = Vista generated trip
35 = Elite display disconnected

36 = Undetermined EPLD fault
37 = Watchdog trip
38 = No Vista configuration loaded
39 = Fibre-optic control Trip

Description: **Motor Temperature** **Elite Screen:** **A7**
Parameter: 135 Access: R Range: 0..65535
Units * Scale: %, (100% = 8192) Base is rated motor temperature

Description: **Inverter Temperature** **Elite Screen:** **A7**
Parameter: 136 Access: R Range: 0..65535
Units * Scale: %, (100% = 8192) Base is rated inverter temperature

Description: **Dynamic Brake Temperature** **Elite Screen:** **-**
Parameter: 137 Access: R Range: 0..65535
Units * Scale: %, (100% = 8192) Base is rated dynamic brake resistor temperature

Description: **Heatsink Temperature** **Elite Screen:** **-**
Parameter: 138 Access: R Range: -50..+100
Units * Scale: ‘C

Description: **Internal Temperature** **Elite Screen:** **-**
Parameter: 139 Access: R Range: -50..+100
Units * Scale: ‘C

Description: **Fibre Reference Input** **Elite Screen:** **-**
Parameter: 140 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Fibre Reference Output** **Elite Screen:** **-**
Parameter: 141 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Input 1** **Elite Screen:** **Z3**
Parameter: 142 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Analogue Input 2** **Elite Screen:** **Z4**
Parameter: 143 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Analogue Output 1** **Elite Screen:** **Z5**
Parameter: 144 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Output 2** **Elite Screen:** **Z6**
Parameter: 145 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is that of source selected

Description: **Analogue Input 1+2** **Elite Screen:** **-**
Parameter: 146 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Software Version** **Elite Screen:** **Z2**
Parameter: 147 Access: R Range: 0..255
Units * Scale: Version*10

Description: **Hardware Version** **Elite Screen:** **Z2**
Parameter: 148 Access: R Range: 0..255
Units * Scale: Version*10

Description: **Reference Speed** **Elite Screen:** **A4**
Parameter: 149 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Reference Torque** **Elite Screen:** **A4**
Parameter: 150 Access: R/W Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated output Torque of motor

Description: **Multifunction Input 1** **Elite Screen:** **Z7**
Parameter: 151 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Multifunction Input 2** **Elite Screen:** **Z7**
Parameter: 152 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Multifunction Input 3** **Elite Screen:** **Z7**
Parameter: 153 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Multifunction Input 4** **Elite Screen:** **Z7**
Parameter: 154 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Multifunction Input 5** **Elite Screen:** **Z7**
Parameter: 155 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Multifunction Input 6** **Elite Screen:** **Z7**
Parameter: 156 Access: R Range: 0..1
Special Values: 0 = closed
1 = open

Description: **Process Error** **Elite Screen:** **P6**
Parameter: 157 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192)

Description: **Process Enable** **Elite Screen:** -
Parameter: 158 Access: R Range: 0..1
Special Values: 0 = Process Control not active
1 = Process Control active

Description: **Process Reference** **Elite Screen:** -
Parameter: 159 Access: R Range: -32768..+32767

Description: **Process Feedback** **Elite Screen:** -
Parameter: 160 Access: R Range: -32768..+32767

Description: **Drive ID** **Elite Screen:** -
Parameter: 161 Access: R Range: 0..65535
Notes: Drive Identification Code

High Byte: 4 = Elite Series

Low Byte: 1 = ME-2.5, 400V
64 = ME-18, 400V
33 = ME-6.5, 400V
128 = ME-22.5 400V
65 = ME-10.5, 400V
34 = ME-31, 400V
97 = ME-12, 400V
66 = ME-38, 400V
96 = ME-16, 400V
2 = ME-46, 400V

Description: **Comparator 1 Output** **Elite Screen:** -
Parameter: 162 Access: R Range: 0..1
Special Values: 0 = Below “OFF” level
1 = Above “ON” level

Description: **Multi Ref Select** **Elite Screen:** -
Parameter: 163 Access: R Range: 0..255

Description: **Motorised Pot Speed** **Elite Screen:** -
Parameter: 164 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated synchronous speed of motor in rpm

Description: **Motorised Pot Torque** **Elite Screen:** -
Parameter: 165 Access: R Range: -32768..+32767
Units * Scale: %, (100% = 8192) Base is rated output Torque of motor

Description: **Status Overload** **Elite Screen:** -
Parameter: 166 Access: R Range: 0..3
Special Values: 0 = No overload warning
1 = Inverter overload warning
2 = Motor overload warning
3 = Inverter and Motor overload warning

Description: **Comparator 2 Output** **Elite Screen:** -
Parameter: 167 Access: R Range: 0..1
Special Values: 0 = Below “OFF” level
1 = Above “ON” level

Description:	**Window Comparator**				**Elite Screen:** **-**
Parameter:	168	Access:	R	Range:	0..1
Special Values:	0 = Outside window 1 = Inside window				

Description:	**Power Out**				**Elite Screen:** **A5**
Parameter:	169	Access:	R	Range:	-32768..+32767
Units * Scale:	%, (100% = 8192) Base is rated power of motor (screen N4)				

Description:	**Output Voltage**				**Elite Screen:** **A8**
Parameter:	170	Access:	R	Range:	0..65535
Units * Scale:	%, (100% = 8192) Base is peak phase voltage i.e., 2				

Description:	**Drive Rated Current**				**Elite Screen:** **-**
Parameter:	171	Access:	R	Range:	0..65535
Units * Scale:	Amps x 10				

SECTION 8: XTRAVERT PARAMETER LISTING

All user adjustable parameters available within the Xtravert can be accessed over the parameter ID/Value channel of the Type 1 parameter process data object (PPO) as described in the PROFIDRIVE profile.

A more detailed explanation of the individual parameters follows.

Param	Screen	Description	Unit*Scale	Range
1	A1	Keyboard Frequency	Hertz * 100	-15000..+15000
2	C1	Frequency Sense ON Setpoint	Hertz * 100	0..15000
3	C2	Frequency Sense OFF Setpoint	Hertz * 100	0..15000
4	C3	Current Sense Setpoint	%I(Inv.) * 1	0..150
5	H2	Comms Timeout Selection	none	0..3
6	I1	Local Keyboard Control	none	0..3
7	I2	Reference Speed Source	none	0..9
8	I3	Alt. Reference Speed Source	none	0..9
9	I4	Analogue Input 1 Type	none	0..1
10	I5	Analogue Input 1 Scaling Low	Hertz * 100	-15000..+15000
11	I6	Analogue Input 1 Scaling High	Hertz * 100	-15000..+15000
12	I7	Analogue Input 2 Scaling Low	Hertz * 100	-15000..+15000
13	I8	Analogue Input 2 Scaling High	Hertz * 100	-15000..+15000
14	I9	Multifunction Input Mode	none	0..13
15	L1	Minimum Frequency	Hertz * 100	0..15000
16	L2	Maximum Frequency	Hertz * 100	0..15000
17	L3	Current Limit	%I(Inv.) * 1	5..150
18	L4	Current Limit Timeout	Sec * 10	0..251
19	L5	Reverse Inhibit	none	0..1
20	L6	Skip Frequency 1	Hertz * 100	-15000..+15000
21	L7	Skip Frequency 2	Hertz * 100	-15000..+15000
22	L8	Skip Frequency Bandwidth	Hertz * 10	0..100
23	L9	Minimum Frequency Run	none	0..1
24	M1	Multispeed Reference Frequency 1	Hertz * 100	-15000..+15000
25	M2	Multispeed Reference Frequency 2	Hertz * 100	-15000..+15000
26	M3	Multispeed Reference Frequency 3	Hertz * 100	-15000..+15000
27	M4	Multispeed Reference Frequency 4	Hertz * 100	-15000..+15000
28	M5	Multispeed Reference Frequency 5	Hertz * 100	-15000..+15000
29	M6	Multispeed Reference Frequency 6	Hertz * 100	-15000..+15000
30	M7	Multispeed Reference Frequency 7	Hertz * 100	-15000..+15000
31	N1	Rated Motor Current	%I(Inv.) * 1	20..150
32	N2	Rated Motor Voltage	Volts / 5	2..100
33	N3	Rated Motor Frequency	Hertz * 1	10..175
34	N4	Rated Motor Power	kW	0..2200
35	N5	Motor Rated RPM	rpm	0..8000
36	N6	Motor Cooling @ 0 Hz	% * 1	5..101
37	O1	Analogue Output Selection	none	0..15

38	O2	Analogue Output Format	none	0..2
39	O3	Output Relay 1 Selection	none	0..17
40	O4	Output Relay 2 Selection	none	0..17
41	P1	Process Reference Source	none	0..5
42	P2	Process Feedback Source	none	0..2
43	P3	Process Controller Gain	none	1..100
44	P4	Process Integral Time Const	Sec * 10	10..10010
45	P5	Process Differential Time Const	Sec * 10	0..2500
46	P6	Process Error	Hz*100	-15000..+15000
47	P7	Feedback Hysteresis	Hertz * 100	0..15000
48	R1	Normal Acceleration Rate	Hertz/Sec * 100	2..50000
49	R2	Normal Deceleration Rate	Hertz/Sec * 100	2..50000
50	R3	Second Acceleration Rate	Hertz/Sec * 100	2..50000
51	R4	Second Deceleration Rate	Hertz/Sec * 100	2..50000
52	R5	Break frequency for Accel Rates	Hertz * 100	0..15000
53	R6	Emergency Stop Decel Rate	Hertz/Sec * 100	2..50000
54	R7	S-Curve Time Constant	Sec * 100	0..50
55	S1	Start Mode	none	0..1
56	S2	Stop Mode	none	0..1
57	S3	Torque Boost	%V(Motor) * 10	0..150
58	S4	DC Hold Level	%V(Motor) * 10	0..250
59	S5	DC Hold Time	Sec * 10	0..250
60	S6	DC Heat Level	%V(Motor) * 10	0..100
61	S7	Mains Power Loss Response	none	0..1
62	X1	Minimum Dynaflux Level	%V(Motor) * 1	40..100
63	X2	AutoBoost Mode	none	0..1
64	X3	Slip Compensation Frequency	% * 10	0..100
65	X4	Current Limit Slip	% * 10	0..100
66	X5	Voltage Limit Slip	% * 10	0..99
67	X6	No Load Damping	% * 10	0..50
68	X7	Modulation Mode	none	0..3
69	X8	Regeneration Mode	none	0..1
70	Y1	Language Selection	none	0..2
71		Comms. 0-10V Out	Vdc *10	0..100
72		Commission Mode	none	0..1
73		Communications Output	none	0..1
74		No Faults	none	0..1
75		Drive Started	none	0..1
76		Drive Running	none	0..1
77		Drive Started / Running	none	0..1
78		Drive Overload	none	0..1
79		Motor Overload	none	0..1
80		Frequency Sense	none	0..1
81		Current Sense	none	0..1
82		Direction	none	0..1
83		At Set Frequency	none	0..1

84	Overload Alarm	none	0..1
85	Power Flow Direction	none	0..1
86	Feedback Relay Sense	none	0..1
87	Reference Frequency Direction	none	0..1
88	Drive Rated Current	I(Inv.) Amps * 10	25..6600
89	Drive Output Current	%I(Inv.) * 4	0..600
90	Drive Output Frequency	Hertz * 100	-15000..+15000
91	Drive Status	none	0..83
92	Drive Reference Frequency	Hertz * 100	-15000..+15000
93	Drive DC Bus Voltage	Volts(DC)	0..840
94	Drive Output Voltage	Volts(rms)	0..595
95	Motor Estimated Temperature	% * 1	0..127
96	Feedback Frequency	Hertz	-15000..+15000
97	Analogue Input 1	none	0..1023
98	0-20mA Analogue Input	none	0..1023
99	Drive Identification (HEX)	none	0..65534
100	Drive Torque Current	%I(Inv.) * 4	-600..+600
101	Drive Temperature	% * 1	0..127
102	Dynamic Brake Temperature	% * 1	0..127
103	Multifunction Inputs	none	0..65534
104	Software Version	none	0..65534

SECTION 9: XTRAVERT PARAMETER DESCRIPTIONS

To reduce the size of the parameter listing the following abbreviations have been used:

Access: R Read access only to this parameter
R/W Read and write access to this parameter

Description: **Keyboard Frequency** **Xtravert Screen: A1**
Parameter: 1 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Frequency Sense ON Setpoint** **Xtravert Screen: C1**
Parameter: 2 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Frequency Sense OFF Setpoint** **Xtravert Screen: C2**
Parameter: 3 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Current Sense Setpoint** **Xtravert Screen: C3**
Parameter: 4 Access: R/W Range: 0..150
Units * Scale: %I(Inv.) * 1

Description: **Comms Timeout Selection** **Xtravert Screen: H2**
Parameter: 5 Access: R/W Range: 0..3
Special Values: 0 = Off
1 = 1 sec
2 = 5 sec
3 = 25 sec
Notes: The Communications Timeout Selection can only be modified when the Xtravert is stopped.

Description: **Local Keyboard Control** **Xtravert Screen: I1**
Parameter: 6 Access: R/W Range: 0..3
Special Values: 0 = Local keyboard control disabled
1 = Reset Only
2 = Stop-Reset Only
3 = Start/Stop-Reset Enabled
Notes: The Local Keyboard Control selection can only be modified when the Xtravert is stopped.

Description: **Reference Speed Source** **Xtravert Screen: I2**
Parameter: 7 Access: R/W Range: 0..9
Special Values: 0 = Null
1 = Keyboard
2 = Analogue I/P 1
3 = Analogue I/P 2
4 = Analogue I/P 1 & 2
5 = Analogue I/P 1 + 2

6 = Multiref 1
7 = Multiref 2
8 = Inch 1
9 = Process Controller

Notes: The Reference Frequency Source can only be modified when the Xtravert is stopped.

Description: **Alt. Reference Speed Source** **Xtravert Screen: I3**
Parameter: 8 Access: R/W Range: 0..9
Special Values: 0 = Null
1 = Keyboard
2 = Analogue I/P 1
3 = Analogue I/P 2
4 = Analogue I/P 1 & 2
5 = Analogue I/P 1 + 2
6 = Multiref 1
7 = Multiref 2
8 = Inch 1
9 = Process Controller

Notes: The Alternative Reference Frequency Source can only be modified when the Xtravert is stopped.

Description: **Analogue Input 1 Type** **Xtravert Screen: I4**
Parameter: 9 Access: R/W Range: 0..1
Special Values: 0 = 0-10V
1 = ±10V

Notes: The Analogue Input 1 Format can only be modified when the Xtravert is stopped.

Description: **Analogue Input 1 Scaling Low** **Xtravert Screen: I5**
Parameter: 10 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Analogue Input 1 Scaling High** **Xtravert Screen: I6**
Parameter: 11 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Analogue Input 2 Scaling Low** **Xtravert Screen: I7**
Parameter: 12 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Analogue Input 2 Scaling High** **Xtravert Screen: I8**
Parameter: 13 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multifunction Input Mode** **Xtravert Screen: I9**
Parameter: 14 Access: R/W Range: 0..13
Special Values: 0 = Local Control
1 = Standard 3 Wire

2 = 3 wire, Alt Ref
3 = 2 wire, Alt Ref
4 = 2 wire, Start-Reset
5 = 2 wire, Accel/Decel
6 = 2 wire, Inch Alt Ref
7 = 2 wire F/B Enable
8 = 3 wire Multi-Ref
9 = 2 wire Multi-Ref
10 = 2 wire Motor Pot
11 = Motor Pot with direction
12 = Crane Mode 1
13 = Comms Address Mode

Notes: The Multifunction Input Mode Select can only be modified when the Xtravert is stopped.

WARNING: Altering the Multifunction Input Mode Select of the Xtravert completely re-configures the control input terminals and the logic of their operation. Be quite sure that you understand the operating mode you require, and that any inputs already connected will not cause the Xtravert to automatically start once your mode is selected.

Description: **Minimum Frequency** **Xtravert Screen: L1**
Parameter: 15 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Maximum Frequency** **Xtravert Screen: L2**
Parameter: 16 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Current Limit** **Xtravert Screen: L3**
Parameter: 17 Access: R/W Range: 5..150
Units * Scale: %I(Inv.) * 1

Description: **Current Limit Timeout** **Xtravert Screen: L4**
Parameter: 18 Access: R/W Range: 0..251
Units * Scale: Sec * 10

Description: **Reverse Inhibit** **Xtravert Screen: L5**
Parameter: 19 Access: R/W Range: 0..1
Special Values: 0 = No inhibit
1 = Reverse inhibited

Notes: The Reverse Direction Inhibit mode can only be modified when the Xtravert is stopped.

Description: **Skip Frequency 1** **Xtravert Screen: L6**
Parameter: 20 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Skip Frequency 2** **Xtravert Screen: L7**
Parameter: 21 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Skip Frequency Bandwidth** **Xtravert Screen: L8**
Parameter: 22 Access: R/W Range: 0..100
Units * Scale: Hertz * 10
Notes: Do not overlap skip zones unless only one zone is required. If only one zone is required, define the same frequency for both skip zones.

Description: **Minimum Frequency Run** **Xtravert Screen: L9**
Parameter: 23 Access: R/W Range: 0..1
Special Values: 0 = Don't run at Minimum Frequency
1 = Run at Minimum Frequency
Notes: The Minimum Frequency Run Mode can only be modified when the Xtravert is stopped.

Description: **Multispeed Reference Frequency 1** **Xtravert Screen:M1**
Parameter: 24 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 2** **Xtravert Screen:M2**
Parameter: 25 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 3** **Xtravert Screen:M3**
Parameter: 26 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 4** **Xtravert Screen:M4**
Parameter: 27 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 5** **Xtravert Screen:M5**
Parameter: 28 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 6** **Xtravert Screen:M6**
Parameter: 29 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Multispeed Reference Frequency 7** **Xtravert Screen:M7**
Parameter: 30 Access: R/W Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Rated Motor Current** **Xtravert Screen: N1**
Parameter: 31 Access: R/W Range: 20..150
Units * Scale: %I(Inv.) * 1

Description: **Rated Motor Voltage** **Xtravert Screen: N2**
Parameter: 32 Access: R/W Range: 2..100
Units * Scale: Volts / 5

Description: **Rated Motor Frequency** **Xtravert Screen: N3**
Parameter: 33 Access: R/W Range: 10..175
Units * Scale: Hertz * 1

Description: **Rated Motor Power** **Xtravert Screen: N4**
Parameter: 34 Access: R/W Range: 0..2200
Units * Scale: kW

Description: **Motor Rated RPM** **Xtravert Screen: N5**
Parameter: 35 Access: R/W Range: 0..8000
Units * Scale: rpm

Description: **Motor Cooling @ 0 Hz** **Xtravert Screen: N6**
Parameter: 36 Access: R/W Range: 5..101
Units * Scale: % * 1

Description: **Analogue Output Selection** **Xtravert Screen: O1**
Parameter: 37 Access: R/W Range: 0..15
Special Values: 0 = Null
1 = Full Scale
2 = O/P Frequency ± 50Hz
3 = O/P Frequency ± 60Hz
4 = O/P Frequency ±100Hz
5 = O/P Frequency ±120Hz
6 = O/P Current
7 = O/P Volts
8 = Host Communications
9 = Torque Current
10 = Motor Power
11 = Ref Frequency ± 50Hz
12 = Ref Frequency ± 60Hz
13 = Ref Frequency ± 100Hz
14 = Ref Frequency ± 120Hz
15 = Process Error
Notes: The Analogue Output Mode can only be modified when the Xtravert is stopped.

Description: **Analogue Output Format** **Xtravert Screen: O2**
Parameter: 38 Access: R/W Range: 0..2
Special Values: 0 = 0-10V
1 = ±10V
2 = 4-20mA
Notes: The Analogue O/P 1 Format can only be modified when the Xtravert is stopped.

Description: **Output Relay 1 Selection** **Xtravert Screen: O3**
Parameter: 39 Access: R/W Range: 0..17
Special Values: 0 = De-Energised
1 = Energised
2 = No Fault
3 = Start

4 = Run
5 = Start or Run
6 = Inverter O/L
7 = Motor O/L
8 = Freq Sense
9 = Current Sense
10 = Inverter Direction
11 = Comms Output
12 = At Set Frequency
13 = Overload Alarm
14 = Power Flow
15 = Feedback Sense
16 = Reference Frequency Direction
17 = No Faults Limit

Notes: The Output Relay Mode Selection can only be modified when the Xtravert is stopped.

Description: **Output Relay 2 Selection** **Xtravert Screen: O4**
Parameter: 40 Access: R/W Range: 0..17
Special Values: See Output Relay 1 Selection above for enumeration list.
Notes: The Output Relay Mode Selection can only be modified when the Xtravert is stopped.

Description: **Process Reference Source** **Xtravert Screen: P1**
Parameter: 41 Access: R/W Range: 0..5
Special Values: 0 = Null
1 = Local
2 = Analogue I/P 1
3 = Analogue I/P 2
4 = Multiref 1
5 = Multiref 2
Notes: The Proceess Reference Source can only be modified when the Xtravert is stopped.

Description: **Process Feedback Source** **Xtravert Screen: P2**
Parameter: 42 Access: R/W Range: 0..2
Special Values: 0 = None
1 = Analogue I/P 1
2 = Analogue I/P 2
Notes: The Process Feedback Source can only be modified when the Xtravert is stopped.

Description: **Process Controller Gain** **Xtravert Screen: P3**
Parameter: 43 Access: R/W Range: 1..100

Description: **Process Integral Time Const** **Xtravert Screen: P4**
Parameter: 44 Access: R/W Range: 10..10010
Units * Scale: Sec * 10

Description: **Process Differential Time Const** **Xtravert Screen: P5**
Parameter: 45 Access: R/W Range: 0..2500
Units * Scale: Sec * 10

Description: **Process Error** **Xtravert Screen: P6**
Parameter: 46 Access: R Range: -15000..+15000
Units * Scale: Hz*100

Description: **Feedback Hysteresis** **Xtravert Screen: P7**
Parameter: 47 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Normal Acceleration Rate** **Xtravert Screen: R1**
Parameter: 48 Access: R/W Range: 2..50000
Units * Scale: Hertz/Sec * 100

Description: **Normal Deceleration Rate** **Xtravert Screen: R2**
Parameter: 49 Access: R/W Range: 2..50000
Units * Scale: Hertz/Sec * 100

Description: **Second Acceleration Rate** **Xtravert Screen: R3**
Parameter: 50 Access: R/W Range: 2..50000
Units * Scale: Hertz/Sec * 100

Description: **Second Deceleration Rate** **Xtravert Screen: R4**
Parameter: 51 Access: R/W Range: 2..50000
Units * Scale: Hertz/Sec * 100

Description: **Break frequency for Accel Rates** **Xtravert Screen: R5**
Parameter: 52 Access: R/W Range: 0..15000
Units * Scale: Hertz * 100

Description: **Emergency Stop Decel Rate** **Xtravert Screen: R6**
Parameter: 53 Access: R/W Range: 2..50000
Units * Scale: Hertz/Sec * 100

Description: **S-Curve Time Constant** **Xtravert Screen: R7**
Parameter: 54 Access: R/W Range: 0..50
Units * Scale: Sec * 100

Description: **Start Mode** **Xtravert Screen: S1**
Parameter: 55 Access: R/W Range: 0..1
Special Values: 0 = Normal Ramp Start
1 = Spinning Start
Notes: The Start Mode can only be modified when the Xtravert is stopped.

Description: **Stop Mode** **Xtravert Screen: S2**
Parameter: 56 Access: R/W Range: 0..1
Special Values: 0 = Ramp Deceleration
1 = Spin - DC Brake
Notes: The Stop Mode can only be modified when the Xtravert is stopped.

Description: **Torque Boost** **Xtravert Screen: S3**
Parameter: 57 Access: R/W Range: 0..150
Units * Scale: %V(Motor) * 10

Description: **DC Hold Level** **Xtravert Screen: S4**
Parameter: 58 Access: R/W Range: 0..250
Units * Scale: %V(Motor) * 10

Description: **DC Hold Time** **Xtravert Screen: S5**
Parameter: 59 Access: R/W Range: 0..250
Units * Scale: Sec * 10

Description: **DC Heat Level** **Xtravert Screen: S6**
Parameter: 60 Access: R/W Range: 0..100
Units * Scale: %V(Motor) * 10

Description: **Mains Power Loss Response** **Xtravert Screen: S7**
Parameter: 61 Access: R/W Range: 0..1
Special Values: 0 = No trip
1 = Trip after 2 sec
Notes: The Mains Power Loss Response can only be modified when the Xtravert is stopped.

Description: **Minimum Dynaflux Level** **Xtravert Screen: X1**
Parameter: 62 Access: R/W Range: 40..100
Units * Scale: %V(Motor) * 1

Description: **AutoBoost Mode** **Xtravert Screen: X2**
Parameter: 63 Access: R/W Range: 0..1
Special Values: 0 = No
1 = Yes
Notes: The Torque Boost Mode can only be modified when the Xtravert is stopped.

Description: **Slip Compensation Frequency** **Xtravert Screen: X3**
Parameter: 64 Access: R/W Range: 0..100
Units * Scale: % * 10

Description: **Current Limit Slip** **Xtravert Screen: X4**
Parameter: 65 Access: R/W Range: 0..100
Units * Scale: % * 10

Description: **Voltage Limit Slip** **Xtravert Screen: X5**
Parameter: 66 Access: R/W Range: 0..99
Units * Scale: % * 10

Description: **No Load Damping** **Xtravert Screen: X6**
Parameter: 67 Access: R/W Range: 0..50
Units * Scale: % * 10

Description: **Modulation Mode** **Xtravert Screen: X7**
Parameter: 68 Access: R/W Range: 0..3

Special Values: 0 = Narrow Band 8kHz
1 = Whisper Wave 8kHz
2 = Narrow Band 5kHz
3 = Whisper Wave 5kHz
Notes: The Modulation Mode can only be modified when the Xtravert is stopped.

Description: Regeneration Mode **Xtravert Screen: X8**
Parameter: 69 Access: R/W Range: 0..1
Special Values: 0 = Voltage Clamp
1 = Dynamic Brake

Description: Language Selection **Xtravert Screen: Y1**
Parameter: 70 Access: R/W Range: 0..2
Special Values: 0 = English
1 = Deutsch
2 = Espanol
Notes: The Language Selection can only be modified when the Xtravert is stopped.

Description: Comms. 0-10V Out **Xtravert Screen: -**
Parameter: 71 Access: R/W Range: 0..100
Units * Scale: Vdc *10
Notes: Controls the analogue output channel of the Xtravert. To actually output this voltage, the Communications Analogue Output must be selected as the Analogue Output Mode (Screen O1).

Description: Commission Mode **Xtravert Screen: -**
Parameter: 72 Access: R/W Range: 0..1
Special Values: 0 = No commission
1 = Commission
Notes: The Serial Communications Option Module allows modification of the operating parameters and modes of the Xtravert irrespective of the commission mode.

Description: Communications Output **Xtravert Screen: -**
Parameter: 73 Access: R/W Range: 0..1
Special Values: 0 = Relay Closed State
1 = Relay Open State
Notes: Used for controlling the state of a Xtravert relay.

Description: No Faults **Xtravert Screen: -**
Parameter: 74 Access: R Range: 0..1
Special Values: 0 = Fault Present
1 = No Faults

Description: Drive Started **Xtravert Screen: -**
Parameter: 75 Access: R Range: 0..1
Special Values: 0 = Drive Not Started
1 = Drive Started

Description: **Drive Running** **Xtravert Screen:** -
Parameter: 76 Access: R Range: 0..1
Special Values: 0 = Drive Not Running
1 = Drive Running

Description: **Drive Started / Running** **Xtravert Screen:** -
Parameter: 77 Access: R Range: 0..1
Special Values: 0 = Drive Not Started and Not Running
1 = Drive Started or Running

Description: **Drive Overload** **Xtravert Screen:** -
Parameter: 78 Access: R Range: 0..1
Special Values: 0 = Drive Not Overloaded
1 = Drive Overloaded

Description: **Motor Overload** **Xtravert Screen:** -
Parameter: 79 Access: R Range: 0..1
Special Values: 0 = Motor Not Overloaded
1 = Motor Overloaded

Description: **Frequency Sense** **Xtravert Screen:** -
Parameter: 80 Access: R Range: 0..1
Special Values: 0 = Freq. < Freq. Sense Off
1 = Freq. >= Freq. Sense On

Description: **Current Sense** **Xtravert Screen:** -
Parameter: 81 Access: R Range: 0..1
Special Values: 0 = Motor Current < (Current Sense - 5%)
1 = Motor Current >= Current Sense

Description: **Direction** **Xtravert Screen:** -
Parameter: 82 Access: R Range: 0..1
Special Values: 0 = Xtravert operating in Reverse direction
1 = Xtravert operating in Forward direction

Description: **At Set Frequency** **Xtravert Screen:** -
Parameter: 83 Access: R Range: 0..1
Special Values: 0 = Not At Set Frequency
1 = Xtravert running but not accelerating and not decelerating

Description: **Overload Alarm** **Xtravert Screen:** -
Parameter: 84 Access: R Range: 0..1
Special Values: 0 = No alarm present
1 = Alarm present
Notes: Indicates motor overload or drive overload.

Description: **Power Flow Direction** **Xtravert Screen:** -
Parameter: 85 Access: R Range: 0..1
Special Values: 0 = Motoring
1 = Regenerating

Description: **Feedback Relay Sense** **Xtravert Screen:** -
Parameter: 86 Access: R Range: 0..1
Special Values: 0 = Feedback above reference
1 = Feedback below reference
Notes: Indicates, in closed loop operation, the relationship between the feedback and the reference signals.

Description: **Reference Frequency Direction** **Xtravert Screen:** -
Parameter: 87 Access: R Range: 0..1
Special Values: 0 = -ve Reference frequency direction
1 = +ve Reference frequency direction

Description: **Drive Rated Current** **Xtravert Screen:** -
Parameter: 88 Access: R Range: 25..6600
Units * Scale: I(Inv.) Amps * 10
Notes: Determines the absolute rated current of the Xtravert.

Description: **Drive Output Current** **Xtravert Screen:** -
Parameter: 89 Access: R Range: 0..600
Units * Scale: %I(Inv.) * 4
Notes: The Drive Output Current value is expressed as a ratio (0-600 = 0-150%) of the absolute rated current of the drive.

Description: **Drive Output Frequency** **Xtravert Screen:** -
Parameter: 90 Access: R Range: -15000..+15000
Units * Scale: Hertz * 100
Notes: + represents forward phase rotation. - represents reverse phase rotation.

Description: **Drive Status** **Xtravert Screen:** -
Parameter: 91 Access: R Range: 0..83
Special Values: 0 = Drive Stopped
1 = Drive Stopping
2 = Drive Ready
3 = Drive Running
4 = Drive Inching
5 = Drive Accelerating
6 = Drive Decelerating
7 = Drive Current Limiting
8 = Drive Voltage Limiting
9 = Drive Host Stop
64 = EEPROM Failure
65 = Invalid Software
66 = LVDC Supply Low
67 = Low Mains Supply
68 = Overvoltage Trip
69 = Supply Fault
70 = Output I Imbalance
71 = Overcurrent Trip

72 = IGBT Overload
73 = Brake Thermal Trip
74 = Drive Thermal Trip
75 = Motor Thermal Trip
76 = Data Corrupted
77 = Motor Stalled
78 = Calibration Fault
79 = Ground Fault
80 = External Trip
81 = Internal PTC Trip
82 = Host Trip
83 = Communications Timeout

Notes: The Drive Status has two ranges of values representing the non-fault and fault conditions of the Xtravert.

Description: **Drive Reference Frequency** **Xtravert Screen:** -
Parameter: 92 Access: R Range: -15000..+15000
Units * Scale: Hertz * 100

Description: **Drive DC Bus Voltage** **Xtravert Screen:** -
Parameter: 93 Access: R Range: 0..840
Units * Scale: Volts(DC)

Description: **Drive Output Voltage** **Xtravert Screen:** -
Parameter: 94 Access: R Range: 0..595
Units * Scale: Volts(rms)

Description: **Motor Estimated Temperature** **Xtravert Screen:** -
Parameter: 95 Access: R Range: 0..127
Units * Scale: % * 1
Notes: The estimated motor temperature is relative to the rated motor temperature rise.

Description: **Feedback Frequency** **Xtravert Screen:** -
Parameter: 96 Access: R Range: -15000..+15000
Units * Scale: Hertz
Notes: The Feedback Frequency is the value of the source selected as the Feedback Source. The Feedback Frequency is undefined if the Feedback Source is selected as Open Loop.

Description: **Analogue Input 1** **Xtravert Screen:** -
Parameter: 97 Access: R Range: 0..1023
Notes: 0-1023 corresponds to actual -10V to +10V input.

Description: **0-20mA Analogue Input** **Xtravert Screen:** -
Parameter: 98 Access: R Range: 0..1023
Notes: 0-963 corresponds to actual 0-20mA input.

Description: **Drive Identification (HEX)** **Xtravert Screen:** -
Parameter: 99 Access: R Range: 0..65534
Notes: The Drive Identification is represented by two bytes.

High byte : Represents the drive type

5 = Xtravert

Low byte : Represents the drive model

0 = X302 2.5A
1 = X304 4A
2 = X307 7A
3 = X309 9A
4 = X502 2.5A
5 = X504 4A
6 = X507 7A
7 = X509 9A
8 = X512 12A
9 = X516 16A
13 = X702 2.5A
14 = X704 4A
15 = X707 7A
16 = X709 9A
17 = X712 12A
18 = X716 16A

Description: **Drive Torque Current** **Xtravert Screen:** -
Parameter: 100 Access: R Range: -600..+600
Units * Scale: %I(Inv.) * 4
Notes: The Drive Torque Current value is expressed as a ratio (0-600 = 0-150%) of the torque producing component of the rated current of the drive. The sign of the Drive Torque Current indicates the power flow direction. Positive Drive Torque Current indicates the power is flowing out of the drive (motoring). Negative Drive Torque Current indicates power is flowing into the drive (regenerating).

Description: **Drive Temperature** **Xtravert Screen:** -
Parameter: 101 Access: R Range: 0..127
Units * Scale: % * 1
Notes: The estimated drive temperature is relative to the rated drive temperature rise.

Description: **Dynamic Brake Temperature** **Xtravert Screen:** -
Parameter: 102 Access: R Range: 0..127
Units * Scale: % * 1
Notes: The estimated dynamic brake temperature is relative to the rated dynamic brake temperature rise.

Description: **Multifunction Inputs** **Xtravert Screen:** -
Parameter: 103 Access: R Range: 0..65534

Description: **Software Version** **Xtravert Screen:** -
Parameter: 104 Access: R Range: 0..65534
Notes: The returned number is coded in hexadecimal e.g.: 50H (80 decimal) represents Version 5.0.

APPENDIX A: LED DISPLAY FAULT CODES

PBUS HARDWARE FAULT DISPLAY CODES

H004 PBUS EEPROM failed read / write

ELITE SERIES ERROR DISPLAY CODES

F001 Low DC bus voltage
F002 High DC bus voltage
F003 High DC bus voltage time-out
F004 Input supply phase voltage imbalance
F005 Software download fault
F006 EEPROM fault
F007 Current limit fault
F008 +ve U-phase IGBT desaturation
F009 +ve V-phase IGBT desaturation
F010 +ve W-phase IGBT desaturation
F011 -ve U-phase IGBT desaturation
F012 -ve V-phase IGBT desaturation
F013 -ve W-phase IGBT desaturation
F014 -ve phase IGBT desaturation (on smaller Elites)
F015 Inverter thermal model overload trip
F016 Motor thermal model overload trip
F017 DB resistor thermal model overload trip
F018 EEPROM reading fault (cleared from screen Y2)
F019 Zero nameplate parameter detected
F020 Inconsistent nameplate param. detected
F021 Excessive current flow to ground
F022 External/PTC trip
F023 Excessive heatsink temperature trip
F024 Excessive internal temperature trip
F025 Host computer generated trip
F026 Time since last serial comms exceeds T/O period
F027 Time since last F/O comms exceeds T/O period
F028 Maximum output speed exceeded
F029 Torque limit time-out
F030 Speed limit time-out
F031 Calibration fault

F032 Software time-out fault
F033 Low voltage dc supply fault
F034 Vista generated trip
F035 Elite display disconnected
F036 Undetermined fault detected by EPLD
F037 Watchdog trip
F038 No Vista configuration loaded
F039 Trip detected on fibre-optic control network

XTRAVERT SERIES ERROR DISPLAY CODES

F064 EEPROM Failure
F065 Invalid Software
F066 LVDC Supply Low
F067 Low Mains Supply
F068 Over-voltage Trip
F069 Supply Fault
F070 Output I Imbalance
F071 Over-current Trip
F072 IGBT Overload
F073 Brake Thermal Trip
F074 Drive Thermal Trip
F075 Motor Thermal Trip
F076 Data Corrupted
F077 Motor Stalled
F078 Calibration Fault
F079 Ground Fault
F080 Motor Microtherm Trip
F081 Drive Heatsink PTC
F082 Host Trip
F083 Communications Timeout

APPENDIX B: FAULT FINDING

STATUS: **ALL STATUS AND INDICATOR LEDS OFF**

Possible Reason: +24V power supply is incorrectly terminated.

+24V power supply not switched on.

Action: Check that the +24V power supply is terminated as per wiring diagrams shown in figures 2.2 and 2.4.

Check the +24V power supply is present on the terminals of the PROFIBUS interface.

If +24V supply is present on the supply terminals and no indicators are lit then it is likely that the internal fuse has ruptured due to excessive over-voltage or reverse polarity. The four screws holding the external metal work together must be removed to gain access to this fuse. Replace with the correct fuse as detailed in Section 1.

STATUS: **STATUS DISPLAYS THREE HORIZONTAL BARS WHEN MOTOR CONTROLLER IS CONNECTED.**

Possible Reason: Motor controller is not powered up.

Communications cable is incorrectly terminated.

MODBUS communications address in the motor controller is not set to 10.

MODBUS communications baudrate in the motor controller is not set to 9600.

Motor controller software revision does not support the PROFIBUS interface.

Xtravert communication circuit power supply crowbar has operated.

Action: Check that power is applied to motor controller.

Check that the communications cable is terminated as per wiring diagrams shown in figures 2.2 and 2.4 for the Elite series and Xtravert respectively.

Check the current software version of the motor controller against the list of supported motor controllers given in Section 1.

Check that +24V exists between the red and green wire of the Xtravert communications connection. If not then cycle the power supply to the Xtravert to allow the power supply to reset.

STATUS:	**STATUS DISPLAY SHOWS ROTATING BAR BUT UNABLE TO CONTROL XTRAVERT SPEED.**
Possible Reason:	Speed reference is not set to Local.
	Alternative speed reference is currently active.
Action:	Check the speed reference source (Screen I2) is set to Local.
	Check that the multifunction input mode (Screen I9) is set to Local Control.

STATUS:	**STATUS DISPLAY SHOWS ROTATING BAR BUT UNABLE TO START XTRAVERT**
Possible Reason:	The current multifunction input mode is configured to have a hard wired stop circuit which is not presently closed.
Action:	Check that the multifunction input mode (screen I9) is set to Local Control.

STATUS:	**XTRAVERT RUNS AT LAST SPEED REFERENCE WHEN VERY LARGE SPEED REFERENCE IS APPLIED (POSITIVE OR NEGATIVE)**
Possible Reason:	The commanded speed reference is larger than the allowable range for the motor controller.
Action:	Check speed reference is within acceptable range.

APPENDIX C: GSD FILE

The following shortened GSD file contains the minimum information required to allow the PBus interface to be configured by Profibus configuration tools.

The full GSD file for the PBUS interface is available from PDL Electronics, Part No. device description files disk

```
;=============================================================================
;        Cutdown GSD file for a Elite / Xtravert Series AC Motor Controllers
;=============================================================================
; Part Number : PBUS
;; Freeze_mode_supp, Sync_mode_supp, Auto_baud_supp, 12Mbit/s
; Copyright (C) PDL Electronics 1998. All rights reserved. Confidential
;; Date :
; File : PDL_04B6.GSD
; Rev. : A
;;=============================================================================
#Profibus_DP
; Unit-Definition-List:
GSD_Revision = 1
Vendor_Name =  “PDL Electronics”
Model_Name = “PBUS Interface”
Revision = “ V1 0.0”
Ident_Number=0x04B6
Protocol_Ident = 0
Station_Type = 0
Hardware_Release = “V1.0”
Software_Release = “V1.0”
9.6_supp=1
19.2_supp=1
45.45_supp=1
93.75_supp=1
187.5_supp=1
500_supp=1
1.5M_supp=1
3M_supp=1
6M_supp=1
12M_supp=1
```

```
MaxTsdr_9.6=60
MaxTsdr_19.2=60
MaxTsdr_45.45=250
MaxTsdr_93.75=60
MaxTsdr_187.5=60
MaxTsdr_500=100
MaxTsdr_1.5M=150
MaxTsdr_3M=250
MaxTsdr_6M=450
MaxTsdr_12M=800
Implementation_Type = “ SPC3”
Bitmap_Device = “PDL04b6n”
Bitmap_Diag=”PDL04b6d”
Bitmap_SF = “PDL04b6s”

; Slave-Specification:
OrderNumber = “PDL Part No. PBUS”
Freeze_Mode_supp = 1
Sync_Mode_supp = 1
Min_Slave_Intervall = 1
Max_Diag_Data_Len = 13        ;6 STANDARD + 1 length + 5 drives
Modul_Offset = 0
Slave_Family = 1
Modular_Station = 1
Max_Module = 1
Max_Input_Len = 12
Max_Output_Len = 12
Max_Data_Len = 24
; UserPrmData: Length and Preset:
User_Prm_Data_Len = 1
Max_User_Prm_Data_Len = 230

MODULE=”MODBUS Gateway - 8 Byte I/O”        0xB7
Ext_Module_Prm_Data_Len = 2
Ext_User_Prm_Data_Const (1) = 0xFF
EndModule
```

```
MODULE="Elite-PPO Typ1, w/o params"   0xBB
Ext_Module_Prm_Data_Len = 2
Ext_User_Prm_Data_Const (1) = 0x04
EndModule
;
MODULE="Elite-PPO Typ3, w/o params"   0xB3
Ext_Module_Prm_Data_Len = 2
Ext_User_Prm_Data_Const (1) = 0x04
EndModule
;
MODULE="Xtravert-PPO Typ1, w/o params"        0xBB
Ext_Module_Prm_Data_Len = 2
Ext_User_Prm_Data_Const (1) = 0x05
EndModule
;
MODULE="Xtravert-PPO Typ3, w/o params"        0xB3
Ext_Module_Prm_Data_Len = 2
Ext_User_Prm_Data_Const (1) = 0x05
EndModule
;
```

APPENDIX D: APPLICATION INFORMATION

EXAMPLE USE OF PROFIDRIVE PPO TYPE 1.

The following example shows how to use both the Parameter data object to set parameter 64 to a value of 876 and the Process data object to set the speed to 102 rpm and start the drive. The Parameter data object and the Process data object will be dealt with separately for reasons of clarity however since they are both parts of the same message buffer they will happen simultaneously.

USING THE PARAMETER DATA OBJECT

The Parameter data object part of PPO Type 1 has the format shown in Table D1. The task of setting parameter 64 to a value of 876 can be broken down into three parts, that is the Parameter ID, Index and Value, each of which are listed below.

<table>
<tr><td>Byte 0</td><td>Byte 1</td><td>Byte 2</td><td>Byte 3</td><td>Byte 4</td><td>Byte 5</td><td>Byte 6</td><td>Byte 7</td></tr>
<tr><td colspan="8">Parameter Data Object</td></tr>
<tr><td colspan="2" rowspan="2">Parameter ID
See Table 5.6</td><td colspan="2">Index</td><td colspan="4">Parameter Value</td></tr>
<tr><td>High Byte</td><td>Low Byte</td><td>Highest Byte</td><td colspan="3">Lowest Byte</td></tr>
</table>

Table D1 Parameter Data Object

The Parameter ID is made of three basic fields (see Table D2).

The Reason Code (RC) (see table 5.4), the spontaneous message bit (SPM) and the actual parameter number.

In our case we are writing a parameter value so the RC field will be 2 Hex.

The SPM bit is always zero.

The Parameter number is 64 = 40 Hex

Putting these three fields together we get the following Parameter ID

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Function	RC				SPM	Parameter number										
Value	2				0				4				0			

Table D2 Parameter ID (Ouput)

The Index field is always zero as none of the PBUS parameters are stored in arrays.

The parameter value is stored in a long word (4 bytes), all the PBUS parameters are only word values and hence only use bytes 6 and 7. Bytes 4 an 5 are always zero.

876 = 036C Hex, so bytes 6 and 7 are 03h and 6Ch respectively.

Putting all these fields together into one packet we get the following message.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Parameter Data Object							
Parameter ID See Table D2		Index High Byte	 Low Byte	Parameter Value Highest Byte			 Lowest Byte
20h	40h	00h	00h	00h	00h	03h	6Ch

Table D3 Complete Parameter Data Object (Output)

The completed Parameter data object message will be transferred to the PBUS interface on the next I/O data cycle but will not be processed immediately by the PBUS interface.

Use of the Parameter data object requires the PROFIBUS mater to use a request / response handshake procedure, the master can not send a new message until the slave device acknowledges the previous message.

POSITIVE RESPONSE TO PARAMETER DATA OBJECT.

Once the PBUS interface has processed the request a typical positive response is shown in Table D4 below and the following descriptions.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Parameter Data Object							
Parameter ID See Table D2		Index High Byte	Low Byte	Parameter Value Highest Byte			Lowest Byte
10h	40h	00h	00h	00h	00h	03h	6Ch

Table D4 Positive Response - Parameter Data Object (Input)

The Parameter ID contains the response code, SPM and parameter number. The response code in this case is 1 indicating that this is transferring the parameter value (see Table 5.5 for a list of response codes), the SPM and parameter number remain unchanged.

The Index will always be zero.

The parameter value returned will be the same as that sent.

NEGATIVE RESPONSE TO PARAMETER DATA OBJECT.

It is possible that a negative response will be returned if the parameter does not exist or the value sent is out of range. In this case a typical negative response message is shown in Table D5 below and the following descriptions.

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Parameter Data Object							
Parameter ID See Table D2		Index High Byte	Low Byte	Parameter Value Highest Byte			Lowest Byte
70h	40h	00h	00h	00h	00h	00h	02h

Table D5 Negative Response - Parameter Data Object (Input)

The Parameter ID contains the response code, SPM and parameter number. The response code in this case is 7 indicating that the request has been rejected (see Table 5.5 for a list of response codes), the SPM is zero and the parameter number will be the same as sent (the parameter number is always returned to allow identification of the message to which the error is reported).

The Index will always be zero.

The parameter value field will return the actual error code, in this case 2 which indicates that the upper or lower limit of this parameter is exceeded (see Table 5.6 for a list of the possible response error codes).

USING THE PROCESS DATA OBJECT

While this example deals with the use of PROFIDRIVE PPO Type 1 specifically, the same practice can be applied to the PPO Type 3, the only difference being the byte position of the various parts of the message (i.e. the control word is in bytes 8 and 9 of PPO type 1 and in bytes 0 and 1 of PPO Type 3). Refer to Table 5.1 for PPO Type 1 Buffer layout and Table 5.2 for PPO Type 3 Buffer layout.

The Process data object is made up of two parts, the Control word and reference speed. Each of these is discussed separately below.

The Control word to the PBUS interface provides commands which act upon the internal PROFIDRIVE state machine (refer to Fig. 5.1). To reach the OPERATION ENABLED state several control commands may be required depending upon the current state.

The current state of the PROFIDRIVE state machine is determined by reading the status word and referring to Table 5.8 for a description of the individual bits.

For this example we will assume that the status word has a value of xx40 Hex (xx = don't care) which indicates that we are in the SWITCH ON INHIBIT state. To reach the OPERATION ENABLED state we need to step the state machine which will take several I/O data cycles.

To start drive if current state is SWITCH ON INHIBIT to step state machine to the OPERATION ENABLED state.

Pseudo code:

If current state = SWITCH ON INHIBIT

    Issue OFF1 command

If current state = READY FOR SWITCHING ON

    Issue ON command

If current state = READY FOR OPERATION

    Issue ENABLE command

Note: To stop drive, if the current state is OPERATION ENABLED and we want to stop the drive we only need to issue an INHIBIT command.

The OFF1 command is xxx6 Hex (see Fig. 5.1) so for this first Control word message we need to set this to xxx6 Hex.

The reference speed command is the simplest part of all, the rpm is simply entered into the reference speed word location.

102 rpm = 0066 Hex.

Putting all these fields together into one packet we get the following first message.

Byte 8	Byte 9	Byte 10	Byte 11
Process Data Object			
Control Word		Reference Speed Word	
High Byte	Low Byte	High Byte	Low Byte
xxh	x6h	00h	66h

Table D6 Complete Process Data Object (Output)

The next few output messages will only differ in the value of the control word as the state machine is stepped into operation enabled state following the Pseudo code given above.

A typical response is shown below.

Byte 8	Byte 9	Byte 10	Byte 11
Process Data Object			
Status Word		Actual Speed Word	
High Byte	Low Byte	High Byte	Low Byte
xxh	37h	00h	36h

Table D7 Complete Process Data Object (Input)

In the Process data object Input shown in Table D7 the current state is OPERATION ENABLED (Status word = xx37 Hex) and the current speed is 54 rpm (36 Hex = 54 decimal).

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