
PDL ELECTRONICS LTD

Leaders in AC Motor Control



**ELITE SERIES
SERIAL COMMUNICATIONS MANUAL
Part No. 4201-206 Rev C**

Head Office:
81 Austin Street
P.O. Box 741
Napier
New Zealand
Tel.: +64-6-843-5855
Fax.: +64-6-843-5185



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AC Motor Control Products can dramatically improve your process control, productivity and energy efficiency, but only if they are working correctly.

Which is why we at PDL Electronics go to great lengths in our design and manufacturing, to ensure that our products operate correctly first time, every time.

An extensive research and development investment ensures that this product is one of the most technically advanced in the world, with built-in strength and robustness to suit your application and environment.

Our NZS/AS/ISO9001 certification gives you the confidence of our international, independently certified Quality Assurance program. All staff are actively involved in continuous improvement programs with a customer focus.

The components that go into our products are selected from the best in the world - and must pass our rigorous and demanding test program.

Finally, every new motor controller design is run through a rigorous test program, including full load operation at above rated temperature, under the most demanding load conditions.

Our dedication to quality makes the PDL Electronics product, regardless of price, less expensive than other controllers in the long run.

COMPREHENSIVE SUPPORT PROGRAM

The PDL Electronics customer support program demonstrates our confidence in our Quality Assurance system. We have total faith in our products and their reliability, and so provide a comprehensive warranty.

Fully trained engineers and technicians, with a wealth of experience and easy access to information, can assist in solving any of your drive application projects.

Our service staff are available for commissioning, after sales service, and repairs, 24 hours a day, seven days a week.

We select capable and highly qualified representatives to act as our distributors and service agents. Only after passing PDL Electronics' intensive training program are they accredited for repair or on-selling of our products.

To further support our products and customers, we run a series of comprehensive training programs focusing on self maintenance and application advice. These are available on-site and at our Head Office.

REVISION HISTORY

Date:	Revision:	Description:
June 1997	A	Created and issued.
October 1998	B	Updated for Rev 2.0 software
January 2000	C	Updated

IMPORTANT NOTES

WARNING:

- The Elite operates from HIGH ENERGY ELECTRICAL SUPPLIES. Stored charge is present after switch off.
- Service only by qualified personnel.
- Always wear safety glasses if operating with the Elite cover removed.
- Never work on live equipment alone.
- Observe all recommended practices.
- Understanding of the equipment is the key to safe and efficient use - please read this manual thoroughly.

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SPECIFICATIONS

HARDWARE: RS232

Physical link	– Three wire, optically isolated, half duplex, single ended RS232
Terminals	T41 – RS232 receive line T42 – RS232 transmit line T40 – 0V signal
Output signal levels	– Logic '1' $\leq 6.5V$ with respect to 0V – Logic '0' $\geq 6.5V$ with respect to 0V
Input Signal Levels	– Logic '1' $< +0.8V$ – Logic '0' $> +2.4V \pm 30V$ maximum
Maximum line loading	– 2500pF, 3k Ω
Isolation	– $\pm 50Vdc$ from ground
Modbus monitored inputs	– Seven switch inputs 2 Programmable Analogue Inputs 0-10V/ $\pm 10V$ /4-20mA/0-20mA
Modbus controlled outputs	– Three relay outputs 2 Programmable Analogue Outputs 0-10V/ $\pm 10V$ /4-20mA/0-20mA
Maximum number of Elites on RS232 Link	– 1
Maximum cable length	– 15 metres

HARDWARE: RS485

Physical link	– Two wire, optically isolated, half duplex, differential mode RS485
Terminals	T38 – RS485 A (negative) T39 – RS485 B (positive) T40 – Isolated 0V shield
Output signal levels	– Logic '1' = +5V differential – Logic '0' = –5V differential
Input signal levels	– Logic '1' = +5V differential – Logic '0' = –5V differential
Isolation	– $\pm 50Vdc$ from ground
Modbus monitored inputs	– Seven switch inputs 2 Programmable Analogue Inputs 0-10V/ $\pm 10V$ /4-20mA/0-20mA
Modbus controlled outputs	– Three relay outputs 2 Programmable Analogue Outputs 0-10V/ $\pm 10V$ /4-20mA/0-20mA
Maximum number of Elites on RS485 Link	– 240
Maximum cable length	– 1000 metres

SOFTWARE:

Communication protocol	– Industry standard Modbus protocol
Transmission mode	– Remote terminal unit (RTU) framing
Error detection	– CRC-16 (cyclic redundancy check)
Baud rate	– User selected – OFF/1200/4800/9600 baud
Data length	– 8 bit binary + parity Optional
Parity	– Selectable Even, Odd, None
Stop bits	– 1
Elite address range	– 240 individual addresses (1–240) – 15 group broadcast addresses (241–255) – 1 global broadcast address (0)
Response time	– Minimum 3.5 character times to maximum 100ms
Supported Modbus Functions	– 3 Read Holding Register – 16 Force Multiple Registers
Supported Modbus Exception Codes	– 1 Illegal Function – 2 Illegal Data Address – 3 Illegal Data Value – 6 Busy, Rejected Message – 7 NAK - Negative Acknowledge

1 INTRODUCTION

The Elite contains built-in Serial Communications circuitry, allowing the Elite to be physically linked onto a Modbus communications network. The two Serial Communications standards available in the Elite are RS232 and RS485.

The RS485 network has a multi-drop capability, allowing up to 240 slave units (Microdrive, Microflo, Microvector and the Elite and Xtravert Series) to be linked to the one Modbus master controller. The RS232 system permits the connection of one unit only on a line.

The Elite acts as a slave peripheral when connected on a Modbus system. This means that the Elite does not initiate Modbus messages - this duty is done by a Modbus master.

The Elite can be controlled and/or monitored as a slave unit from a host computer (or PLC) Modbus master at a remote location.

All the controls, parameters, and modes available on the Elite are available by using the Modbus Serial communications. For example the Modbus master can start and stop the motor, control its speed, monitor the estimated motor temperature and the status of the drive.

In addition to the functions available via the keyboard of the Elite, the Modbus master can monitor and control a process by using the Elite control board inputs and outputs. Both digital and analogue I/O are accessible to the Modbus master at a remote location.

The Elite serial communications uses the hardware standard RS232 and RS 485 for the physical link (i.e. the wiring connection) and the industry standard Modbus protocol for the communications protocol (i.e. the message syntax and error detection).

2 SERIAL COMMUNICATIONS - WIRING AND COMMISSIONING

2.1 WIRING

STEP 1: FRONT COVER REMOVAL

Remove the front cover for access to the gland plate and the terminals.

STEP 2: ELITE RS232 WIRING

Wire the RS232 terminal connections as shown in Fig. 2.1 into the RS232 system. Bring the wiring into the enclosure through the gland plate and install the glands to maintain IP54 integrity.

STEP 3: ELITE RS485 WIRING

Wire the RS485 terminal connections as shown in Fig. 2.2 into the RS485 system. Bring the wiring into the enclosure through the gland plate and install the glands to maintain IP54 integrity.

Should the Modbus master not have RS485 I/O capability, an RS232 port with an RS232/RS485 converter can be used to interface into the RS485 Modbus system. Refer Appendix A for more information on RS232/RS485 conversion.

Note 1: Because the EIA RS232 standard does not define a high impedance power “OFF” state, multiple drivers and receivers are not allowed on the same communication line.

Note 2: Because the EIA RS232 standard is susceptible to electrical interference and has a relatively low maximum line capacitance, the maximum cable length should not exceed 15 metres.

Note 3: For typical connection diagrams refer Appendix C.

STEP 4: FRONT COVER REPLACEMENT

Replace the front cover using the reverse process of Step 1.

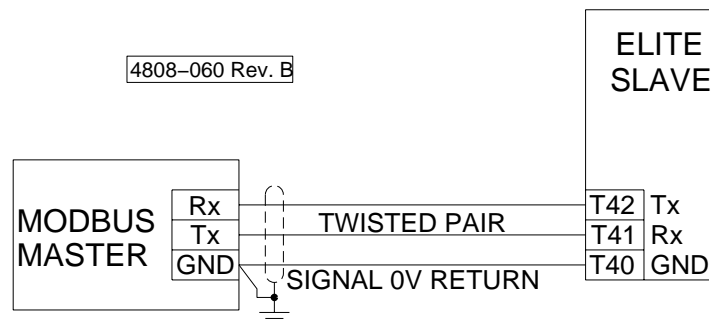


Fig. 2.1 Elite RS232 Modbus system wiring configuration

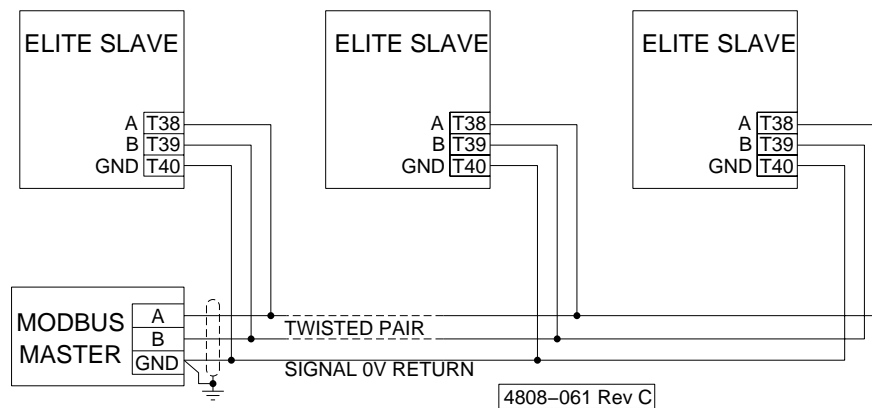


Fig. 2.2 Elite RS485 Modbus system wiring configuration

2.2 COMMISSIONING

STEP 1: ELITE OPERATION CHECK

Switch on power to the Elite and confirm that the Elite operates normally, displaying the status line and the control line A4.

STEP 2: SETTING THE COMMISSION MODE ON THE ELITE

To commission the Elite for Serial Communications, the Elite must be set to commission mode. Select Screen Group Z and set Screen Z **COMMISSION=Y**.

STEP 3: SETTING THE COMMUNICATION ADDRESS

Select Screen H3a and set the Modbus Serial Communications Address (1-240). The address selected must be unique for each Elite connected on the RS485 Modbus system. Record the selected value for the communication address in the Commissioning Configuration Record - refer Microdrive Elite Instruction Manual (PDL Part No. 4201-180).

STEP 4: SETTING THE COMMUNICATION BAUDRATE

Select Screen H3b and set the Modbus Serial Communications Baud Rate (OFF/1200/4800/9600). The baud rate selected must match that of the Modbus master for communication to occur. The selection OFF disables the Elite serial communications. Record the selected value for the communication baud rate in the Commissioning Configuration Record - refer Microdrive Elite Instruction Manual (PDL Part No. 4201-180).

STEP 5: SETTING THE COMMUNICATION PARITY SELECTION

Select Screen H3c and set the Modbus Parity Selection (Even, Odd, None). The Parity Selected must match that of the Modbus master for communication to occur. Record the selected value for the communication Parity in the Commissioning Configuration Record - refer Microdrive Elite Instruction Manual (PDL Part No. 4201-180).

STEP 6: SETTING THE COMMUNICATION TIMEOUT SELECTION

Select Screen H2 and set the Modbus Serial Communications Timeout (OFF/1s/5s/25s). Select a timeout period which exceeds the time between valid serial communication data transfers. Record the selected value for the communication timeout in the Commissioning Configuration Record - refer Microdrive Elite Instruction Manual (PDL Part No. 4201-180).

STEP 7: APPLICATION SPECIFIC COMMISSIONING

Further commissioning of the Elite will depend upon the particular serial communication application.

STEP 8: RE-ENABLING RESTRICTED SECURITY ACCESS

When all further commissioning is completed, set Screen Z **COMMISSION=N** to prevent unauthorised modification of the Elite settings.

Serial Communication commissioning is now complete.

3 SUPPORTED MODBUS FUNCTIONS

3.1 INTRODUCTION

The Elite serial communications protocol adheres completely to the industry standard Modbus protocol. The Elite supports a subset of the complete Modbus function set, listed in Fig. 3.1.

Function	Description
3	Read Multiple Holding Registers
16	Force Multiple Holding Registers

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Fig 3.1: Modbus Functions supported by the Elite

Modbus Function 3 and 16 refer to Holding Registers with addresses of the form 4XXXX. All data address references are made relative to the first address of the particular Modbus Function. In the case of Functions 3 and 16, the first address is 40001(decimal), and this would be referenced as 00000.

An example Modbus Function 3 query message is shown in Fig. 3.2, and a typical response message is given in Fig. 3.3. A fuller explanation of the message contents is given in Section 3.2.

All word length(2 byte) variables are transmitted with the most significant byte first. The holding register contents are transmitted in a 16-bit format with the most significant byte first. Where appropriate, negative numbers will be transmitted in "two's complement" format. If more than one register is requested, the lowest addressed register is transmitted first and the other holding registers will follow in sequential order.

3.2 MODBUS FUNCTION 3 - READ MULTIPLE HOLDING REGISTERS

This function allows a Modbus master to acquire the contents of a holding register from the addressed slave unit. This function will only access the individually addressed Elite and does not support global broadcast or group broadcast addressing modes.

The Elite implementation of this function allows up to 16 holding registers to be read in one message. All registers can be read through Function 3.

An example Modbus Query message showing the format of the Read Multiple Holding Registers is shown in Fig. 3.1.

The example shown in Fig. 3.1. reads from an Elite whose Modbus system address is 10(decimal), 0A(hexadecimal). As the data addresses use relative addressing (refer Section 3.1) the starting address is relative to 40001. This example reads the value of holding registers 40001 to 40003, so the starting address relative to 40001 is 0(decimal), 0000(hexadecimal).

Modbus System Address	Modbus Function Code	Data Address Start(40001)	Number of Holding Registers(=3)	CRC
0AH	03H	00H 00H	00H 03H	04H B0H

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Fig. 3.2: Example Modbus Message using RTU Framing

A typical response to the example Function 3 Query shown in Fig 3.2 is shown in Fig 3.3.

The data byte count is the number of data bytes following in the message. This is computed as two bytes per register, giving a byte count of six.

The data returned is interpreted as follows. The Data Address 40001 is the rated (nameplate) motor current and has a value of $(100\% \times 7537/8192) = 92.0\%$ of the rated drive current (2.5A, so motor current is $0.92 \times 2.5 = 2.3A$). The Data Address 40002 is the rated (nameplate) motor voltage and has a value of 230V. The Data Address 40003 is the rated (nameplate) motor frequency and has a value of 50Hz.

Modbus System Address	Modbus Function Code	Byte Count	Data(40001) (=7537)	Data(40002) (=230)	Data(40003) (=50)	CRC
0AH	03H	06H	1DH 71H	00H E6H	00H 32H	4DH E1H

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Fig. 3.3: Example Modbus Message Response using RTU Framing

The CRC value is calculated from all the bytes in the response including the Modbus system address, Modbus function code, the data address start, number of holding registers, the byte count and the data bytes. The method used for calculating the CRC value is discussed in Appendix B.5. The data byte count is the number of data bytes in the response message - 3 word length registers, each of 2 bytes gives 6 bytes of data.

When an error has occurred (e.g. by trying to read from a non-existent register), the Elite returns an exception response containing an exception code indicating the type of error. Refer to Appendix B.6 for the exception response format and an explanation of the exception codes.

3.3 MODBUS FUNCTION 16 - FORCE MULTIPLE HOLDING REGISTERS

This function allows a Modbus master to control the value of a number of holding registers in the addressed slave unit. Any holding register which is not read-only may be forced to a new value. Since the Elite will still have control over the value in each of the holding registers, the value may still be modified by the Elite after being set by the Modbus master.

The Elite implementation of this function allows up to 16 holding registers to be forced in one message.

This function supports individual addressing as well global broadcast and group broadcast addressing modes. Global broadcast and group addressing modes are discussed in more detail in Section 4.2 and Section 5.3.

An example Modbus Query message showing the format of the Force Multiple Holding Registers is shown in Fig. 3.4.

The example shown in Fig. 3.4 writes to an Elite whose Modbus system address is 10(decimal) 0A(hexadecimal). The data address 40001 is the rated (nameplate) motor current and is modified to $(100\% \times 1.5A / 2.5A) = 60\%$ of drive rated (nameplate current), so the actual value is $(0.6 \times 8192) = 4915$ (decimal), or 1333(hexadecimal). The data address 40002 is the rated (nameplate) motor voltage and is modified to 400V(decimal), 190(hexadecimal).

Modbus System Address	Modbus Function Code	DataAddress Start(40001)	Number of Registers(=2)	Byte Count	Data(40001) (=4915)	Data(40002) (=400)	CRC
0AH	10H	00H 00H	00H 02H	04H	13H 33H	01H 90H	23H FCH

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Fig. 3.4: Function 16 - Force Multiple Holding Registers

A typical response to the example Function 16 Query shown in Fig 3.4 is shown in Fig 3.5.

The response contains the address of the first holding register and the number of registers modified.

Modbus System Address	Modbus Function Code	Data Address Start (40001)	Number of Registers (=2)	CRC
0AH	10H	00H 00H	00H 02H	40H B3H

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Fig. 3.5: Function 16 Response - Force Multiple Holding Registers Response

It should be noted that a value modified over a Modbus message will not be stored in non-volatile memory (EEPROM); the value will be lost when the Elite is powered down. A separate message must be sent that causes a value to be saved in EEPROM.

An example Modbus Query showing the format of a message to cause a rated name plate current to be saved to EEPROM is shown in Fig. 3.6.

Modbus System Address	Modbus Function Code	Data Address = 40885	Number of Registers	Byte count	Data = 40001	CRC
0AH	10H	03H 74H	00 01H	02H	9CH 41H	45H E4H

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Fig. 3.6: Example of message that causes rated name plate current to be saved to EEPROM

The CRC value is calculated from all the bytes in the response including the Modbus system address, Modbus function code, the data bytes and the data byte count. The method used for calculating the CRC value is discussed in Appendix B.5. The data byte count is the number of data bytes in the response message - 2 word length registers, each of 2 bytes gives 4 bytes of data.

When an error has occurred (e.g. by trying to write to a read-only register), the Elite returns an exception response containing an exception code indicating the type of error. Refer to Appendix B.6 for the exception response format and an explanation of the exception codes.

3.4 ELITE BROADCAST ADDRESSING MODES

3.4.1 GLOBAL BROADCAST ADDRESSING MODE

The global broadcast addressing mode allows all the drives connected on a Modbus system to be accessed together.

The Modbus function that supports global broadcast addressing modes is:

Function 16 – Force Multiple Holding Registers

To access all the drives on a Modbus system the Modbus address of zero (0) is used. When this address is used, all slaves on the Modbus system respond to the transmitted message but do not issue a response.

3.4.2 GROUP BROADCAST ADDRESSING MODE

The group broadcast addressing mode allows groups of drives connected on a Modbus system to be accessed together.

The Modbus function that supports group broadcast addressing modes is:

Function 16 – Force Multiple Holding Registers

To access groups of drives on a Modbus system a special system of addressing is used. To group particular drives together, their individual addresses are selected to form that group.

The addresses required to form a Elite group can be selected from Fig. 3.7. There are 240 individual addresses numbered (1..240) consisting of 15 groups of 16 drives each. Each group of drives has a group broadcast address (241-255) and a global broadcast address of zero (0). To determine if a group address should be recognised refer to Fig. 3.7. When this group broadcast address is used, all slaves within the selected group on the Modbus system respond to the transmitted function but do not issue a response.

Group	Individual Address	Group Address	Global Address
Group 1	1..16	241	0
Group 2	17..32	242	0
Group 3	33..48	243	0
Group 4	49..64	244	0
Group 5	65..80	245	0
Group 6	81..96	246	0
Group 7	97..112	247	0
Group 8	113..128	248	0
Group 9	129..144	249	0
Group 10	145..160	250	0
Group 11	161..176	251	0
Group 12	177..192	252	0
Group 13	193..208	253	0
Group 14	209..224	254	0
Group 15	225..240	255	0

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Fig. 3.7: *Elite Modbus Communications Group Addresses*

4 ELITE DATA REGISTERS

4.1 ELITE HOLDING REGISTERS

Section 4.2 summarises the accessible Elite holding registers in Modbus data address order. Section 4.3 cross-references the parameters as they appear on the Elite screens, to Elite holding registers. A more detailed explanation of each holding register is given in Section 4.4. The Modbus system designer should refer to the Microdrive Elite Instruction Manual (PDL Part No. 4201-180) for more information.

Note: Modbus Function 3 allows up to 16 registers to be read at once.

Modbus Function 16 allows up to 16 registers to be written to at once.

4.2 SHORT-FORM MODBUS REGISTER DETAILS ORDERED BY MODBUS ADDRESS

Address	Screen	Description	Range	Scaled Range
40001	N1	Rated (nameplate) motor current	20..150%	1638..12288
40002	N2	Rated (nameplate) motor volts	0..999Vac	0..999
40003	N3	Rated (nameplate) motor frequency	0..400Hz	0..400
40004	N4	Rated (nameplate) motor power	0..650kW	0..65000
40005	N6	Motor cooling at zero speed	20..100%, OFF	1638..8273
40006	N5	Rated (nameplate) motor speed	0..2400rpm	0..24000
40007	N8	Pulse per revolution of tacho encoder	0..8191ppr	0..8191
40008	X2	Autotune motor	0..1	0..1
40010	L8	Regeneration limit	0..250%	0..20480
40011	L2	Minimum speed	-250%..Max Limit	-20480..Max Limit
40012	L3	Maximum speed	Min Limit..+250%	Min Limit..+20480
40013	L6	Speed limit timeout	0..25s,INFINITE	0..26000
40014	L4	Minimum torque	-250%..Max Limit	-20480..Max Limit
40015	L5	Maximum torque	Min Limit..+250%	Min Limit..+20480
40016	L7	Torque limit timeout	0..25s,INFINITE	0..26000
40017	X4c	Starting torque (boost) adjustment	0..250%	0..20480
40018	L9	Current limit	25..150%	2048..12288
40019	X4d	Start Band	0..100%	0..8192
40020	D1	Time constant of dynamic brake resistor	0..250s	0..250
40021	D2	Duty rating of dynamic brake resistor	OFF,1..100%	0..8192
40022	-	Enable Torque Limits	0..1	0..1
40030	H3a	Modbus serial comms address	1..240	1..240
40031	H3b	Modbus serial comms baud-rate	0..3	0..3
40032	H2	Modbus serial comms timeout period	0..3	0..3
40033	-	Disable serial writes	0..1	0..1
40034	H3c	Modbus parity selection	Even,Odd,None	0..2
40040	-	Acceleration rate reference	0.02..1300%/s	1..65000
40041	-	Deceleration rate reference	0.02..1300%/s	1..65000
40042	R6	Decel(stopping) rate used when stopping	0.02..1300%/s	1..65000
40043	R7	Speed filter time constant	0..60s/(100%/s)x1000	0..6000
40044	R8	Torque filter time constant	0..10s	0..10000
40050	S6	Off delay time	0..25s, INFINITE	0..26000
40051	S5	Start delay time	0..1s	0..1000
40052	-	Stop mode in use	0..5	0..5
40053	S7	Mains power loss response	0..1	0..1
40056	S8	Level of dc current used for braking	0..150%	0..12288
40057	S1	V/Hz starting mode	0..2	0..2
40058	S9	DC Hold level	0..25%	0..2048
40059	S10	DC Heat level	OFF, 1..30%	0..2457
40060	X3e	Field weakening point	50..100%	4096..8192
40061	X3a	Main inductance	40..800%	3276..65535
40062	X3b	Stator resistance	0..15%	0..1228
40063	X3c	Rotor resistance	0..15%	0..1228
40064	X3d	Total leakage	0..20%	0..1638

40066	X5g	Current PI loop proportional gain	0..100%	0..8192
40067	X5h	Current PI loop integral gain	0..100%	0..8192
40068	X4g	Rotor speed PID loop integral gain	0..999%	0..4096
40069	X4h	Rotor speed PID loop derivative gain	0..999%	0..4096
40070	X4f	Rotor speed PID loop proportional gain	0..300%	0..24576
40071	X5i	Rotor speed PID filter constant	3..100%	245..8192
40072	X5e	Modulation type	0..1	0..1
40073	X5f	Modulation frequency	AUTO,4000..16000	3999..16000
40080	-	Host reset control	0..1	0..1
40081	-	Host stop control	0..1	0..1
40082	-	Host start control	0..1	0..1
40083	-	Host trip control	0..1	0..1
40084	-	Speed / Torque Mode reference	0..1	0..1
40085	I1	Local start stop and reset control	0..3	0..3
40088	A3	Local speed reference	-250..+250%	-20480..+20480
40089	Status Line	, overload, speed/torque indication ***	0..128	0..128
40090	Status Line, A5	Motor speed ***	-400..+400%	-32768..+32767
40091	Status Line	Motor torque ***	-400..+400%	-32768..+32767
40092	A8	DC bus voltage ***	0..800%	0..65535
40093	A6	Current output ***	0..800%	0..65535
40094	-	Tacho calculated rotor speed ***	-32768..+32767	-32768..+32767
40095	F	Current fault status ***	0..39	0..39
40098	A5	Power output ***	-400..+400%	-32768..+32767
40099	A8	Voltage output ***	0..800%	0..65535
40100	A7	Estimated motor temperature ***	0..800%	0..65535
40101	A7	Estimated inverter temperature ***	0..800%	0..65535
40102	-	Estimated D/B resistor temperature ***	0..800%	0..65535
40103	-	Reserved ***	-50..100	-50..100
40104	-	Reserved ***	-50..100	-50..100
40107	I8c	Fibre optic control mode select	0..5	0..5
40108	-	Fibre reference input ***	-400..+400%	-32768..+32767
40110	-	Fibre reference output ***	-400..+400%	-32768..+32767
40113	I8d	Fibre optic communication timeout	0..3	0..3
40114	Z11	Fibre optic input value ***	-400..+400%	-32768..+32767
40116	I8a	Fibre optic input low setpoint	-400..+400%	-32768..+32767
40117	I8b	Fibre optic input high setpoint	-400..+400%	-32768..+32767
40120	Z3	Analogue input 1 value ***	-400..+400%	-32768..+32767
40121	Z4	Analogue input 2 value***	-400..+400%	-32768..+32767
40122	Z5	Analogue output 1 value ***	-400..+400%	-32768..+32767
40123	Z6	Analogue output 2 value ***	-400..+400%	-32768..+32767
40124	-	Analogue input 1+2 value ***	-400..+400%	-32768..+32767
40125	I6b	Analogue input 1 low setpoint	-400..+400%	-32768..+32767
40126	I6c	Analogue input 1 high setpoint	-400..+400%	-32768..+32767
40127	I6e	Analogue input 2 low setpoint	-400..+400%	-32768..+32767
40128	I6f	Analogue input 2 high setpoint	-400..+400%	-32768..+32767
40129	O1c	Analogue output 1 low setpoint	-400..+400%	-32768..+32767
40130	O1d	Analogue output 1 high setpoint	-400..+400%	-32768..+32767
40131	O1g	Analogue output 2 low setpoint	-400..+400%	-32768..+32767
40132	O1h	Analogue output 2 high setpoint	-400..+400%	-32768..+32767
40133	I6g	Zero band for analogue I/P sources	0..1	0..1
40134	I6a,Z3	Analogue input 1 format	0..3	0..3
40135	I6d,Z4	Analogue input 2 format	0..3	0..3
40136	O1b,Z5	Analogue output 1 format	0..3	0..3
40137	O1f,Z6	Analogue output 2 format	0..3	0..3
40138	I7b	Multi-function input logical inversion	0..1	0..1
40139	N9	Encoder type select	0..1	0..1
40140	Z2	Software version ***	0..25.5	0..255
40141	Z2	Hardware version ***	0..25.5	0..255
40150	Y1	Screen list select	0..255	0..255

40151	Y3	Current Vista configuration select	0..255	0..255
40152	Y3	Number of Vista configurations ***	0..255	0..255
40153	-	Vista block Error code ***	0..255	0..255
40161	A4	Reference speed	-400..+400%	-32768..+32767
40162	A4	Reference torque	-400..+400%	-32768..+32767
40170	Z7	Status of Multifunction input 1 (read only)	0..1	0..1
40171	Z7	Status of Multifunction input 2 ***	0..1	0..1
40172	Z7	Status of Multifunction input 3 ***	0..1	0..1
40173	Z7	Status of Multifunction input 4 ***	0..1	0..1
40174	Z7	Status of Multifunction input 5 ***	0..1	0..1
40175	Z7	Status of Multifunction input 6 ***	0..1	0..1
40176	Z7	Status of Multifunction I/P 7 / Ex.Trip ***	0..1	0..1
40180	-	Elite stop signal ***	0..1	0..1
40181	-	Elite start signal***	0..1	0..1
40182	-	Elite reset signal ***	0..1	0..1
40183	-	Elite run command	0..1	0..1
40190	L10	Skip Speed 1	-250..+250%	-20480..+20480
40191	L11	Skip Speed 2	-250..+250%	-20480..+20480
40192	L12	Skip Bandwidth	0..20%	0..1638
40200	F6	Clear Fault History	0..1	0..1
40201	F1	Fault History 1 ***	0..39	0..39
40202	F2	Fault History 2 ***	0..39	0..39
40203	F3	Fault History 3 ***	0..39	0..39
40204	F4	Fault History 4 ***	0..39	0..39
40205	F5	Fault History 5 ***	0..39	0..39
40210	X4a	Dynaflux minimum flux level	40..100%	3276..8192
40211	X4b	Select torque boost mode	0..2	0..2
40212	X5a	Current limit slip value	0..10%, OFF	0..901
40213	X5b	Voltage limit slip value	0..20%	0..1638
40214	X5c	No-load damping	0..20%	0..1638
40215	X5d	Slip compensation enable	0..1	0..1
40220	P6	Process control error signal ***	-400..+400%	-32768..+32767
40221	-	Process control enable ***	0..1	0..1
40222	-	Process control reference value ***	-400..+400%	-32768..+32767
40223	-	Process control feedback value ***	-400..+400%	-32768..+32767
40224	P1	Process control reference source select	0..7	0..7
40225	P2	Process control feedback source select	0..7	0..7
40226	P3	Process control gain factor	0.1..10	1..100
40227	P4	Process control integration time	10..1000s/OFF	10..10010
40228	P5	Process control differential factor	0..250s	0..2500
40229	P7	Process Control Invert	0..1	0..1
40230	-	Inverter rated voltage	400,690Vac	400,690
40231	-	Inverter rated current	0..6553amps	0..65535
40613	-	Drive identification code ***	0..65535	-
40885	-	EEPROMAddress***	40001..49999 (excluding 40885)	40001..49999 (excluding 40885)
41001	I7c	Multi-function input 1 select	0..18	0..18
41002	I7d	Multi-function input 2 select	0..18	0..18
41003	I7e	Multi-function input 3 select	0..18	0..18
41004	I7f	Multi-function input 4 select	0..18	0..18
41005	I7g	Multi-function input 5 select	0..18	0..18
41006	I7h	Multi-function input 6 select	0..18	0..18
41007	I7a	Multi-function input mode select	0..5	0..5
41010	C2	Comparator 1 "ON" setpoint	-250..+250%	-20480..+20480
41011	C3	Comparator 1 "OFF" setpoint	-250..+250%	-20480..+20480
41012	C1	Comparator 1 source select	0..18	0..18
41013	-	Comparator 1 output ***	0..1	0..1
41014	I2	Speed reference source select	0..8	0..8
41015	I3	Torque reference source select	0..7	0..7

41016	I4	Alt speed reference source select	0..8	0..8
41017	I5	Alt torque reference source select	0..7	0..7
41019	-	Multi-reference select ***	0..255	0..255
41020	M1	Multi-reference 1 setpoint	-400..+400%	-32768..+32767
41021	M2	Multi-reference 2 setpoint	-400..+400%	-32768..+32767
41022	M3	Multi-reference 3 setpoint	-400..+400%	-32768..+32767
41023	M4	Multi-reference 4 setpoint	-400..+400%	-32768..+32767
41024	M5	Multi-reference 5 setpoint	-400..+400%	-32768..+32767
41025	M6	Multi-reference 6 setpoint	-400..+400%	-32768..+32767
41026	M7	Multi-reference 7 setpoint	-400..+400%	-32768..+32767
41027	O2a	Relay 1 source select	0..22	0..22
41028	O2c	Relay 2 source select	0..22	0..22
41029	O2e	Relay 3 source select	0..22	0..22
41030	O2b	Invert the logic of Relay 1	0..1	0..1
41031	O2d	Invert the logic of Relay 2	0..1	0..1
41032	O2f	Invert the logic of Relay 3	0..1	0..1
41033	O1a	Analogue output 1 source selection	0..18	0..18
41034	O1e	Analogue output 2 source selection	0..18	0..18
41039	O3a	Fibre optic output source select	0..18	0..18
41041	A2	Keyboard torque reference	-250..+250%	-20480..+20480
41042	A1	Keyboard speed/torque mode select	0..1	0..1
41043	R1	Acceleration rate	0.02..1300%/s	1..65000
41044	R2	Deceleration rate	0.02..1300%/s	1..65000
41045	R3	Alternative acceleration rate	0.02..1300%/s	1..65000
41046	R4	Alternative deceleration rate	0.02..1300%/s	1..65000
41047	R5	Break speed for Alt accel/decel	0..250%	0..20480
41048	S2	Usual stopping mode	0..5	0..5
41049	S4	Alternative stopping mode	0..5	0..5
41062	-	Motorised potentiometer speed	-400..+400%	-32768..+32767
41063	-	Motorised potentiometer torque ***	-400..+400%	-32768..+32767
41090	Status Line	Inverter and Motor overload warning ***	0..16	0..16
41091	X1	Control mode select	0..2	0..2
41110	C5	Comparator 2 "ON" setpoint	-250..+250%	-20480..+20480
41111	C6	Comparator 2 "OFF" setpoint	-250..+250%	-20480..+20480
41112	C4	Comparator 2 source select	0..18	0..18
41113	-	Comparator 2 output ***	0..1	0..1
41114	-	Window comparator output ***	0..1	0..1

Note 1: 40613 - Drive Identification Code

High Byte:	1 = Microdrive	Low Byte:	1 = ME-2.5,	400V	35 = UE-60,	400V
	2 = Microflo		33 = ME-6.5,	400V	67 = UE-75,	400V
	3 = Microvector		65 = ME-10.5,	400V	129 = UE-90,	400V
	4 = Elite Series		97 = ME-12,	400V	36 = UE-115,	400V
	5 = Xtravert		96 = ME-16,	400V	68 = UE-140,	400V
			64 = ME-18,	400V	32 = UE-170,	400V
			128 = ME-22.5,	400V	69 = UE-210,	400V
			42 = ME-28,	400V	98 = UE-250,	400V
			34 = ME-31,	400V	37 = UE-305,	400V
			66 = ME-38,	400V	72 = UE-340,	400V
			2 = ME-46,	400V	41 = UE-420,	400V
					38 = UE480,	400V
					40 = UE575,	400V
					39 = UE-660,	400V

Note *** indicates that this parameter is a read only parameter.

Fig. 4.1: Elite Modbus Register Details

4.3 SHORT-FORM MODBUS REGISTER DETAILS ORDERED BY SCREEN

Screen	Address	Description	Unit, Scale	Range Scaled
-	40022	Enable Torque limits	0..1	0..1
-	40033	Disable serial writes	0..1	0..1
-	40040	Acceleration rate reference	0.02..1300%/s	1..65000
-	40041	Deceleration rate reference	0.02..1300%/s	1..65000
-	40052	Stop mode in use	0..5	0..5
-	40080	Host reset control	0..1	0..1
-	40081	Host stop control	0..1	0..1
-	40082	Host start control	0..1	0..1
-	40083	Host trip control	0..1	0..1
-	40084	Speed / Torque Mode reference	0..1	0..1
-	40094	Tacho calculated rotor speed***	-32768..+32767	-32768..+32767
-	40102	Estimated dynamic brake resistor temp. ***	0..800%	0..65535
-	40103	Reserved ***	-50..100	-50..100
-	40104	Reserved ***	-50..100	-50..100
-	40108	Fibre reference input ***	-400..+400%	-32768..+32767
-	40110	Fibre reference output ***	-400..+400%	-32768..+32767
-	40120	Analogue input 1 value ***	-400..+400%	-32768..+32767
-	40121	Analogue input 2 value***	-400..+400%	-32768..+32767
-	40122	Analogue output 1 value ***	-400..+400%	-32768..+32767
-	40123	Analogue output 2 value ***	-400..+400%	-32768..+32767
-	40124	Analogue input 1+2 value ***	-400..+400%	-32768..+32767
-	40153	Error code returned by Vista block ***	0..255	0..255
-	40176	Status of Multifunction I/P 7 / Ext.Trip ***	0..1	0..1
-	40180	Elite stop signal ***	0..1	0..1
-	40181	Elite start signal ***	0..1	0..1
-	40182	Elite reset signal ***	0..1	0..1
-	40183	Elite run command	0..1	0..1
-	40221	Process control enable ***	0..1	0..1
-	40222	Process control reference value ***	-400..+400%	-32768..+32767
-	40223	Process control feedback value ***	-400..+400%	-32768..+32767
-	40230	Inverter rated voltage volts	400,690Vac	400,690
-	40231	Inverter rated current	0..6553amps	0..65535
-	40613	Drive identification code ***(Note 1)	0..65535	-
-	40885	EEPROMAddress***	40001..49999 (excluding 40885)	40001..49999 (excluding 40885)
-	41013	Comparator 1 output ***	0..1	0..1
-	41019	Multi-reference select ***	0..255	0..255
-	41062	Motorised potentiometer speed ***	-400..+400%	-32768..+32767
-	41063	Motorised potentiometer torque ***	-400..+400%	-32768..+32767
-	41113	Comparator 2 output ***	0..1	0..1
-	41114	Window comparator output ***	0..1	0..1
Status Line	40089	Status, overload, speed/torque indication ***	0..128	0..128
Status Line	40091	Motor torque ***	-400..+400%	-32768..+32767
Status Line	41090	Inverter and Motor overload warning ***	0..16	0..16
Status Line, A5	40090	Motor speed ***	-400..+400%	-32768..+32767
A1	41042	Keyboard speed/torque mode select	0..1	0..1
A2	41041	Keyboard torque reference	-250..+250%	-20480..+20480
A3	40088	Local speed reference	-250..+250%	-20480..+20480
A4	40161	Reference speed	-400..+400%	-32768..+32767
A4	40162	Reference torque	-400..+400%	-32768..+32767
A5	40098	Power output ***	-400..+400%	-32768..+32767
A6	40093	Current output ***	0..800%	0..65535
A7	40100	Estimated motor temperature ***	0..800%	0..65535
A7	40101	Estimated inverter temperature ***	0..800%	0..65535
A8	40092	DC bus voltage ***	0..800%	0..65535
A8	40099	Voltage output ***	0..800%	0..65535

C1	41012	Comparator 1 source select	0..18	0..18
C2	41010	Comparator 1 "ON" setpoint	-250..+250%	-20480..+20480
C3	41011	Comparator 1 "OFF" setpoint	-250..+250%	-20480..+20480
C4	41112	Comparator 2 source select	0..18	0..18
C5	41110	Comparator 2 "ON" setpoint	-250..+250%	-20480..+20480
C6	41111	Comparator 2 "OFF" setpoint	-250..+250%	-20480..+20480
D1	40020	Time constant of dynamic brake resistor	0..250s	0..250
D2	40021	Duty rating of dynamic brake resistor	OFF,1..100%	0..8192
F	40095	Current fault status ***	0..39	0..39
F1	40201	Fault History 1 ***	0..39	0..39
F2	40202	Fault History 2 ***	0..39	0..39
F3	40203	Fault History 3 ***	0..39	0..39
F4	40204	Fault History 4 ***	0..39	0..39
F5	40205	Fault History 5 ***	0..39	0..39
F6	40200	Clear Fault History	0..1	0..1
H2	40032	Modbus serial comms timeout period	0..3	0..3
H3a	40030	Modbus serial comms address	1..240	1..240
H3b	40031	Modbus serial comms baud-rate	0..3	0..3
H3c	40034	Modbus parity selection	Even,Odd,None	0..2
I1	40085	Local start stop and reset control	0..3	0..3
I2	41014	Speed reference source select	0..8	0..8
I3	41015	Torque reference source select	0..7	0..7
I4	41016	Alt. speed reference source select	0..8	0..8
I5	41017	Alt. torque reference source select	0..7	0..7
I6a,Z3	40134	Analogue input 1 format	0..3	0..3
I6b	40125	Analogue input 1 low setpoint	-400..+400%	-32768..+32767
I6c	40126	Analogue input 1 high setpoint	-400..+400%	-32768..+32767
I6d,Z4	40135	Analogue input 2 format	0..3	0..3
I6e	40127	Analogue input 2 low setpoint	-400..+400%	-32768..+32767
I6f	40128	Analogue input 2 high setpoint	-400..+400%	-32768..+32767
I6g	40133	Zero band for analogue input sources	0..1	0..1
I7a	41007	Multi-function input mode select	0..5	0..5
I7b	40138	Multi-function input logical inversion	0..1	0..1
I7c	41001	Multi-function input 1 select	0..18	0..18
I7d	41002	Multi-function input 2 select	0..18	0..18
I7e	41003	Multi-function input 3 select	0..18	0..18
I7f	41004	Multi-function input 4 select	0..18	0..18
I7g	41005	Multi-function input 5 select	0..18	0..18
I7h	41006	Multi-function input 6 select	0..18	0..18
I8a	40116	Fibre optic input low setpoint	-400..+400%	-32768..+32767
I8b	40117	Fibre optic input high setpoint	-400..+400%	-32768..+32767
I8c	40107	Fibre optic control mode select	0..5	0..5
I8d	40113	Fibre optic communication timeout	0..3	0..3
L2	40011	Minimum speed	-250%..Max Limit	-20480..Max Limit
L3	40012	Maximum speed	Min Limit..+250%	Min Limit..+20480
L4	40014	Minimum torque	-250%..Max Limit	-20480..Max Limit
L5	40015	Maximum torque	Min Limit..+250%	Min Limit..+20480
L6	40013	Speed limit timeout	0..25s,INFINITE	0..26000
L7	40016	Torque limit timeout	0..25s,INFINITE	0..26000
L8	40010	Regeneration limit	0..250%	0..20480
L9	40018	Current limit	25..+150%	2048..12288
L10	40190	Skip Speed 1	-250..+250%	-20480..+20480
L11	40191	Skip Speed 2	-250..+250%	-20480..+20480
L12	40192	Skip Bandwidth	0..20%	0..1638
M1	41020	Multi-reference 1 setpoint	-400..+400%	-32768..+32767
M2	41021	Multi-reference 2 setpoint	-400..+400%	-32768..+32767
M3	41022	Multi-reference 3 setpoint	-400..+400%	-32768..+32767
M4	41023	Multi-reference 4 setpoint	-400..+400%	-32768..+32767
M5	41024	Multi-reference 5 setpoint	-400..+400%	-32768..+32767
M6	41025	Multi-reference 6 setpoint	-400..+400%	-32768..+32767

M7	41026	Multi-reference 7 setpoint	-400..+400%	-32768..+32767
N1	40001	Rated (nameplate) motor current	20..150%	1638..12288
N2	40002	Rated (nameplate) motor volts	0..999Vac	0..999
N3	40003	Rated (nameplate) motor frequency	0..400Hz	0..400
N4	40004	Rated (nameplate) motor power	0..650kW	0..65000
N5	40006	Rated (nameplate) motor speed	0..2400rpm	0..24000
N6	40005	Motor cooling at zero speed	20..100%/OFF	1638..8273
N8	40007	Pulse per revolution of tach encoder	0..8191ppr	0..8191
N9	40139	Encoder type select	0..1	0..1
O1a	41033	Analogue output 1 source selection	0..18	0..18
O1b,Z5	40136	Analogue output 1 format	0..3	0..3
O1c	40129	Analogue output 1 low setpoint	-400..+400%	-32768..+32767
O1d	40130	Analogue output 1 high setpoint	-400..+400%	-32768..+32767
O1e	41034	Analogue output 2 source selection	0..18	0..18
O1f,Z6	40137	Analogue output 2 format	0..3	0..3
O1g	40131	Analogue output 2 low setpoint	-400..+400%	-32768..+32767
O1h	40132	Analogue output 2 high setpoint	-400..+400%	-32768..+32767
O2a	41027	Relay 1 source select	0..22	0..22
O2b	41030	Invert the logic of Relay 1	0..1	0..1
O2c	41028	Relay 2 source select	0..22	0..22
O2d	41031	Invert the logic of Relay 2	0..1	0..1
O2e	41029	Relay 3 source select	0..22	0..22
O2f	41032	Invert the logic of Relay 3	0..1	0..1
O3a	41039	Fibre optic output source select	0..18	0..18
P1	40224	Process control reference source select	0..7	0..7
P2	40225	Process control feedback source select	0..7	0..7
P3	40226	Process control gain factor	1..10.0	1..100
P4	40227	Process control integration time	0.1..1000s/OFF	10..10010
P5	40228	Process control differential factor	0..250s	0..2500
P6	40220	Process control error signal ***	-400..+400%	-32768..+32767
P7	40229	Process control invert	0..1	0..1
R1	41043	Acceleration rate	0.02..1300%/s	1..65000
R2	41044	Deceleration rate	0.02..1300%/s	1..65000
R3	41045	Alternative acceleration rate	0.02..1300%/s	1..65000
R4	41046	Alternative deceleration rate	0.02..1300%/s	1..65000
R5	41047	Break speed for alt. accel/decel	0..250%	0..20480
R6	40042	Decel. rate used when stopping	0.02..1300%/s	1..65000
R7	40043	Speed filter time constant	0-60s/(100%/s) x1000	0..60000
R8	40044	Torque filter time constant	0..10s	0..10000
S1	40057	V/Hz starting mode	0..2	0..2
S2	41048	Usual stopping mode	0..5	0..5
S4	41049	Alternative stopping mode	0..5	0..5
S5	40051	Start delay time	0..1s	0..1000
S6	40050	Off delay time	0..25s, INFINITE	0..26000
S7	40053	Mains power loss response	0..1	0..1
S8	40056	Level of dc current used for braking	0..150%	0..12288
S9	40058	DC holding voltage in V/Hz mode	0..25%	0..2048
S10	40059	DC heating current	OFF/1..40%	0..2457
X1	41091	Control mode select	0..2	0..2
X2	40008	Autotune motor	0..1	0..1
X3a	40061	Main inductance	40..800%	3276..65535
X3b	40062	Stator resistance	0..15%	0..1228
X3c	40063	Rotor resistance	0..15%	0..1228
X3d	40064	Total leakage	0..20%	0..1638
X3e	40060	Field weakening point	50..100%	4096..8192
X4a	40210	Dynaflux minimum flux level	40..100%	3276..8192
X4b	40211	Select torque boost mode	0..2	0..2
X4c	40017	Starting torque (boost) adjustment	0..+250%	0..20480
X4d	40019	Start band	0..100%	0..8192
X4f	40070	Rotor speed PID loop proportional gain	0..300%	0..24576

X4g	40068	Rotor speed PID loop integral gain	0..999%	0..4096
X4h	40069	Rotor speed PID loop derivative gain	0..999%	0..4096
X5a	40212	Current limit slip value	0..10%,OFF	0..901
X5b	40213	Voltage limit slip value	0..20%	0..1638
X5c	40214	No-load damping	0..20%	0..1638
X5d	40215	Slip compensation enable	0..1	0..1
X5e	40072	Modulation type	0..1	0..1
X5f	40073	Modulation frequency	AUTO,4000..16000Hz	3999..16000
X5g	40066	Current PI loop proportional gain	0..100%	0..8192
X5h	40067	Current PI loop integral gain	0..100%	0..8192
X5i	40071	Rotor speed PID filter constant	3..100%	245..8192
Y1	40150	Screen list select	0..255	0..255
Y3	40151	Current Vista configuration select	0..255	0..255
Y3	40152	Number of Vista configurations***	0..255	0..255
Z2	40140	Software version***	0..25.5	0..255
Z2	40141	Hardware version***	0..25.5	0..255
Z3	40120	Analogue input 1 value***	-400..+400%	-32676..+32767
Z4	40121	Analogue input 2 value***	-400..+400%	-32676..+32767
Z5	40122	Analogue output 1 value***	-400..+400%	-32676..+32767
Z6	40123	Analogue output 2 value***	-400..+400%	-32676..+32767
Z7	40170	Status of Multifunction input 1 ***	0..1	0..1
Z7	40171	Status of Multifunction input 2 ***	0..1	0..1
Z7	40172	Status of Multifunction input 3 ***	0..1	0..1
Z7	40173	Status of Multifunction input 4 ***	0..1	0..1
Z7	40174	Status of Multifunction input 5 ***	0..1	0..1
Z7	40175	Status of Multifunction input 6 ***	0..1	0..1
Z11	40114	Fibre optic input value***	-400..+400%	-32768..+32767

Note *** indicates that this parameter is a read only parameter.

Note 1: 40613 - Drive Identification Code

High Byte:	Low Byte:	1 = ME-2.5, 400V	35 = UE-60, 400V
1 = Microdrive	33 = ME-6.5, 400V	67 = UE-75, 400V	
2 = Microflo	65 = ME-10.5, 400V	129 = UE-90, 400V	
3 = Microvector	97 = ME-12, 400V	36 = UE-115, 400V	
4 = Elite Series	96 = ME-16, 400V	68 = UE-140, 400V	
5 = Xtravert	64 = ME-18, 400V	32 = UE-170, 400V	
	128 = ME-22.5, 400V	69 = UE-210, 400V	
	42 = ME-28, 400V	98 = UE-250, 400V	
	34 = ME-31, 400V	37 = UE-305, 400V	
	66 = ME-38, 400V	72 = UE-340, 400V	
	2 = ME-46, 400V	41 = UE-420, 400V	
		38 = UE480, 400V	
		40 = UE575, 400V	
		39 = UE-660, 400V	

Fig. 4.2 Elite Modbus Screen Details

DESCRIPTION: MINIMUMSPEED
 Data Address: 40011 User Name: Min Speed Limit
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..Max Speed Limit Scaled Range: -20480..Max Speed Limit
 Unit * Scale: %, Note: 100% = 8192 (Base is: Rated synchronous speed of motor in rpm)
 Refer Elite Screen: L2
 Notes: Valid values are from -250% to Max Speed Limit.

DESCRIPTION: MAXIMUMSPEED
 Data Address: 40012 User Name: Max Speed Limit
 Data Type: Read/Write Save to EEPROM: Yes
 Range: Min Speed Limit..+250 Scaled Range: Min Speed Limit..+20480
 Unit * Scale: %, Note: 100% = 8192 (Base is: Rated synchronous speed of motor in rpm)
 Refer Elite Screen: L3
 Notes: Valid values are from Min Speed Limit to +250%.

DESCRIPTION: SPEEDLIMITTIMEOUT
 Data Address: 40013 User Name: Speed Limit Timeout
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..25s,INFINITE Scaled Range: 0..26000
 Unit * Scale: s x 1000
 Refer Elite Screen: L6
 Special Values: 26=INF; 26000 = Infinite timeout

DESCRIPTION: MINIMUMTORQUE
 Data Address: 40014 User Name: Min Torque Limit
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..Max Torque Limit Scaled Range: -20480..Max Torque Limit
 Unit * Scale: %, Note: 100% = 8192 (Base is: Rated output torque of motor)
 Refer Elite Screen: L4
 Notes: Valid values are from -250% to Max Torque Limit.

DESCRIPTION: MAXIMUMTORQUE
 Data Address: 40015 User Name: Max Torque Limit
 Data Type: Read/Write Save to EEPROM: Yes
 Range: Min Torque Limit..+250 Scaled Range: Min Torque Limit..+20480
 Unit * Scale: %, Note: 100% = 8192 (Base is: Rated output Torque of motor)
 Refer Elite Screen: L5
 Notes: Valid values are from Min Speed Torque to +250%.

DESCRIPTION: TORQUELIMITTIMEOUT
 Data Address: 40016 User Name: Torque Limit Timeout
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..25s,INFINITE Scaled Range: 0..26000
 Unit * Scale: s x 1000
 Refer Elite Screen: L7
 Special Values: 26=INF; 26000 = Infinite timeout

DESCRIPTION: STARTING TORQUE (BOOST) ADJUSTMENT
 Data Address: 40017 User Name: Start Torque
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..250% Scaled Range: 0..20480
 Unit * Scale: %, Note: 100% = 8192
 Refer Elite Screen: X4c
 Notes: Only used in V/Hz and Open Loop Vector control types

DESCRIPTION: CURRENTLIMIT
 Data Address: 40018 User Name: Current Limit
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 25..150% Scaled Range: 2048..12288
 Unit * Scale: %, Note: 100% = 8192 (Base is: Rated drive current ie. 2.5 Amps)
 Refer Elite Screen: L9

DESCRIPTION: TIME CONSTANT OF DYNAMIC BRAKE RESISTOR
 Data Address: 40020 User Name: DB Time
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..100s Scaled Range: 0..100
 Unit * Scale: s

Refer Elite Screen: D1

DESCRIPTION: DUTY RATING OF DYNAMIC BRAKE RESISTOR
 Data Address: 40021 User Name: DB Duty
 Data Type: Read/Write Save to EEPROM: Yes
 Range: OFF, 1..100% Scaled Range: 0..8192
 Unit * Scale: %, Note: 100% = 8192
 Refer Elite Screen: D2
Special Values: 0 = OFF, Disable dynamic brake resistor thermal model

DESCRIPTION: ENABLE TORQUE LIMITS
 Data Address: 40022 User Name: Enable Tq Limits
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: none
Notes: This flag enables the torque limits (Elite Screens L4 and L5) in V/Hz mode. This flag has no effect in open or closed loop vector. For this mode to work correctly Screen L4 must be less than 0 and Screen L5 must be greater than 0.

DESCRIPTION: MODBUS SYSTEM SERIAL COMMS ADDRESS
 Data Address: 40030 User Name: Comms Address
 Data Type: Read/Write Save to EEPROM: No
 Range: 1..240
 Unit * Scale: none
 Refer Elite Screen: H3a
Notes: Ensure there is only one device in a Modbus system with the selected communications address. Refer to Appendix B.2 for more information on the communications address.

DESCRIPTION: MODBUS SYSTEM SERIAL COMMS BAUDRATE
 Data Address: 40031 User Name: Baud Rate
 Data Type: Read/Write Save to EEPROM: No
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: H3b
Notes: Must match the baud rate of the Modbus master
Special Values: 0 = 2400 2400 baud
 1 = 4800 4800 baud
 2 = 9600 9600 baud
 3 = OFF Disables serial comms
 4 = 1200 1200 baud

DESCRIPTION: MODBUS SYSTEM SERIAL COMMS TIMEOUT PERIOD
 Data Address: 40032 User Name: Comms Timeout
 Data Type: Read/Write Save to EEPROM: No
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: H2
Special Values: 0 = 1s 1 second timeout
 1 = 5s 5 second timeout
 2 = 25s 25 second timeout
 3 = OFF No timeout

DESCRIPTION: DISABLE SERIAL WRITES
 Data Address: 40033 User Name:
 Data Type: Read/Write Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen:
Special Values: 0 = writes allowed
 1 = writes disabled

Notes: In automatic control systems it is often desirable to be able to switch to a local control mode for maintenance or direct operator control.
 In manual operation the operator expects that he has full control of the drive, this can not be guaranteed if a serial communication option is fitted since all registers are available via the serial interface and may be altered.
 The Disable serial writes register prevents all writes during Local operation thus ensuring the operator has Full Control.

DESCRIPTION:	MODBUS PARITY SELECTION		
Data Address:	40034	User Name:	
Data Type:	Read/Write	Save to EEPROM:	No
Range:	0..2		
Unit * Scale:	none		
Refer Elite Screen:	H3c		
<i>Special Values:</i>	0 = EVEN Even Parity Bit		
	1 = ODD Odd Parity Bit		
	2 = NONE No Parity Bit		
<i>Notes:</i>	Must match the Parity of the Modbus Master.		
DESCRIPTION:	ACCELERATION RATE REFERENCE		
Data Address:	40040	User Name:	Ref Accel Rate
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0.02..1300%/s	Scaled Range:	1..65000
Unit * Scale:	% / s*50		
Refer Elite Screen:	-		
<i>Note:</i>	Currently selected acceleration rate.		
DESCRIPTION:	DECELERATION RATE REFERENCE		
Data Address:	40041	User Name:	Ref Decel Rate
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0.02..1300%/s	Scaled Range:	1..65000
Unit * Scale:	% / s*50		
Refer Elite Screen:	-		
<i>Note:</i>	Currently selected deceleration rate.		
DESCRIPTION:	DECELERATION (STOPPING) RATE USED WHEN STOPPING		
Data Address:	40042	User Name:	Stop Rate Decel
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0.02..1300%/s	Scaled Range:	1..65000
Unit * Scale:	%/s * 50		
Refer Elite Screen:	R6		
DESCRIPTION:	SPEED FILTER TIME CONSTANT		
Data Address:	40043	User Name:	Speed Filter Time
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..60s	Scaled Range:	0..60000
Unit * Scale:	s/(100%/s)*1000		
Refer Elite Screen:	R7		
DESCRIPTION:	TORQUE FILTER TIME CONSTANT		
Data Address:	40044	User Name:	Torque Filter Time
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..10s	Scaled Range:	0..10000
Unit * Scale:	s * 1000		
Refer Elite Screen:	R8		
DESCRIPTION:	OFF DELAY TIME		
Data Address:	40050	User Name:	Off Delay Time
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..25s, INFINITE	Scaled Range:	0..26000
Unit * Scale:	s * 1000		
Refer Elite Screen:	S6		
<i>Special Values:</i>	26000=INF	Motor magnetising flux maintained indefinitely	
DESCRIPTION:	START DELAY TIME		
Data Address:	40051	User Name:	Start Delay Time
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1s	Scaled Range:	0..1000
Unit * Scale:	s * 1000		
Refer Elite Screen:	S5		
DESCRIPTION:	STOP MODE REFERENCE		
Data Address:	40052	User Name:	Ref Stop Mode
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..5		
Unit * Scale:	none		

Refer Elite Screen: -
Special Values:
 0 = NORMAL Normal stop
 1 = RAMP Ramp stop
 2 = SPIN Spin stop
 3 = STOP R Stop-rate stop
 4 = OFF Off-stop
 5 = DC BRK DC braking

DESCRIPTION: MAINS POWER LOSS RESPONSE

Data Address: 40053 User Name: Low Voltage Trip
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: S7
Special Values:
 0=N Disable trip on Low Bus Volts
 1=Y Trip on Low BusVolts

DESCRIPTION: LEVEL OF DC CURRENT USED FOR BRAKING

Data Address: 40056 User Name: DC Brake Level
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..150% Scaled Range: 0..12288
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: S8

DESCRIPTION: V/Hz STARTING MODE

Data Address: 40057 User Name: Ref Start Mode
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..2
 Unit * Scale: none
 Refer Elite Screen: S1
Special Values:
 0 = NORMAL Normal start
 1 = SPIN Spin start
 2 = KICK Kick start

DESCRIPTION: LEVEL OF DC HOLDING VOLTAGE USED FOR V/Hz MODE

Data Address: 40058 User Name: DC Hold Level
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..25% Scaled Range: 0..2048
 Unit * Scale: % Note 100%=8192
 Refer Elite Screen: S9

DESCRIPTION: LEVEL OF DC CURRENT USED FOR MOTOR HEATING

Data Address: 40059 User Name: DC Heat Level
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..30% Scaled Range: 0..2457
 Unit * Scale: % Note 100%=8192
 Refer Elite Screen: S10
Special Values:
 0 = OFF No motor heating required.

DESCRIPTION: FIELDWEAKENINGPOINT

Data Address: 40060 User Name: Field Weaken
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 50..100% Scaled Range: 4096..8192
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: X3e

DESCRIPTION: MAIN INDUCTANCE

Data Address: 40061 User Name: Lm
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 40..800% Scaled Range: 3276..65535
 Unit * Scale: % Note 100% = 8192 (*Base is: base ohms*)
 Refer Elite Screen: X3a

DESCRIPTION: STATOR RESISTANCE

Data Address: 40062 User Name: Rs
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..15% Scaled Range: 0..122
 Unit * Scale: % Note 100% = 8192 (*Base is: base ohms*)
 Refer Elite Screen: X3b

DESCRIPTION: ROTOR RESISTANCE

Data Address:	40063	User Name:	Rr
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..15%	Scaled Range:	0..122
Unit * Scale:	% Note 100% = 8192	<i>(Base is: base ohms)</i>	
Refer Elite Screen:	X3c		
DESCRIPTION:	TOTAL LEAKAGE		
Data Address:	40064	User Name:	Sigma
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..20%	Scaled Range:	0..1638
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X3d		
DESCRIPTION:	CURRENT PI LOOP PROPORTIONAL GAIN		
Data Address:	40066	User Name:	Kp I
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..100%	Scaled Range:	0..8192
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5g		
DESCRIPTION:	CURRENT PI LOOP INTEGRAL GAIN		
Data Address:	40067	User Name:	Ki I
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..100%	Scaled Range:	0..8192
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5h		
DESCRIPTION:	ROTOR SPEED PID LOOP INTEGRAL GAIN		
Data Address:	40068	User Name:	Ki w
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..999%	Scaled Range:	0..4096
Unit * Scale:	% Note 100%=256		
Refer Elite Screen:	X4g		
DESCRIPTION:	ROTOR SPEED PID LOOP DERIVATIVE GAIN		
Data Address:	40069	User Name:	Kd w
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..999%	Scaled Range:	0..4096
Unit * Scale:	% Note 100%=256		
Refer Elite Screen:	X4h		
DESCRIPTION:	ROTOR SPEED PID LOOP PROPORTIONAL GAIN		
Data Address:	40070	User Name:	Kp w
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..300%	Scaled Range:	0..24576
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X4f		
DESCRIPTION:	ROTOR SPEED PID FILTER CONSTANT		
Data Address:	40071	User Name:	Kf w
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	3..100%	Scaled Range:	245..8192
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5i		
DESCRIPTION:	MODULATION TYPE		
Data Address:	40072	User Name:	Whisper Wave
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	X5f		
<i>Special Values:</i>	0=NB Narrowband		
	1=WW Whisper Wave		
DESCRIPTION:	MODULATION FREQUENCY		
Data Address:	40073	User Name:	Switching Frequency
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	AUTO,4000..16000	Scaled Range:	3999..16000

Unit * Scale: Hz
Refer Elite Screen: X5e
Special Values: 3999=AUTO Automatic switching frequency selection

DESCRIPTION: HOST RESET CONTROL

Data Address: 40080 User Name: Host Reset
Data Type: Read/Write Save to EEPROM: No
Range: 0..1
Unit * Scale: none
Refer Elite Screen: -

Notes: Elite always resets this value to 0, set to 1 to reset fault.

DESCRIPTION: HOST STOP CONTROL

Data Address: 40081 User Name: Host Stop
Data Type: Read/Write Save to EEPROM: No
Range: 0..1
Unit * Scale: none
Refer Elite Screen: -

Special Values:
0 = Host stop not active
1 = Host stop active

Notes: Setting Host Start will clear Host Stop. Host Stop is also cleared on a fault or after 5 seconds if no comms timeout selected.

DESCRIPTION: HOST START CONTROL

Data Address: 40082 User Name: Host Start
Data Type: Read/Write Save to EEPROM: No
Range: 0..1
Unit * Scale: none
Refer Elite Screen: -

Special Values:
0 = Host start not active
1 = Host start active

Notes: Setting Host Stop will clear Host Start. Host Start is also cleared on a fault or after 5 seconds if no comms timeout selected.

DESCRIPTION: HOST TRIP CONTROL

Data Address: 40083 User Name: Host Trip
Data Type: Read/Write Save to EEPROM: No
Range: 0..1
Unit * Scale: none
Refer Elite Screen: -

Special Values:
0 = Host trip not active
1 = Host trip active

DESCRIPTION: SPEED/TORQUE MODE REFERENCE

Data Address: 40084 User Name: Ref Speed/Torque
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..1
Unit * Scale: none
Refer Elite Screen: -

Special Values:
0 = SPEED MODE
1 = TORQUE MODE

DESCRIPTION: LOCAL START STOP AND RESET CONTROL

Data Address: 40085 User Name: Local Start Stop
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..3
Unit * Scale: none
Refer Elite Screen: I1

Special Values:
0 = 0 NONE No local control
1 = 1 RESET ONLY Reset only
2 = 2 STOP-RESET Stop-Reset
3 = 3 START/STOP-RST Start/Stop-Reset

DESCRIPTION: LOCAL SPEED REFERENCE

Data Address: 40088 User Name: KB Speed
Data Type: Read/Write Save to EEPROM: Yes
Range: -250..+250% Scaled Range: -20480..+20480
Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
Refer Elite Screen: A3

DESCRIPTION:	STATUS, OVERLOAD, SPEED AND TORQUE INDICATION		
Data Address:	40089	User Name:	Status display
Data Type:	Read only	Save to EEPROM:	No
Range:	0..128		
Unit * Scale:	none		
Refer Elite Screen:	Status Line		
<i>Special Values:</i>	0 = OFF	Drive off	
	1 = RUN	Drive running	
	2 = RUN	Drive running	
	3 = RUN	Drive running	
	4 = STP	Drive stopped	
	5 = SPG	Drive stopping	
	6 = ILT	Drive current limiting	
	7 = VLT	Drive voltage limiting	
	8 = SLT	Drive speed limiting	
	9 = TLT	Drive torque limiting	
	10 = INC	Drive inching	
	11 = RDY	Drive ready	
	12 = ATU	Autotuning motor	
	13 = SPG	Drive stopping	
	21-59 = F1-F39	Drive has tripped on fault displayed	
DESCRIPTION:	MOTOR SPEED		
Data Address:	40090	User Name:	O/P Speed
Data Type:	Read only	Save to EEPROM:	No
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192		(Base is: Rated synchronous speed of motor in rpm)
Refer Elite Screen:	Status Line, A5		
DESCRIPTION:	MOTOR TORQUE		
Data Address:	40091	User Name:	O/P Torque
Data Type:	Read only	Save to EEPROM:	No
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192		(Base is: Rated output Torque of motor)
Refer Elite Screen:	Status Line		
DESCRIPTION:	DC BUS VOLTAGE		
Data Address:	40092	User Name:	DC Bus Voltage
Data Type:	Read only	Save to EEPROM:	No
Range:	0..800%	Scaled Range:	0..65535
Unit * Scale:	% Note 100% = 8192		(Base is: Motor voltage * sqrt(2))
Refer Elite Screen:	A8		
DESCRIPTION:	CURRENT OUTPUT		
Data Address:	40093	User Name:	O/P Current
Data Type:	Read only	Save to EEPROM:	No
Range:	0..800%	Scaled Range:	0..65535
Unit * Scale:	% (Base is: Peak rated drive current ie 2.5Amps * sqrt(2))		
Refer Elite Screen:	A6		
DESCRIPTION:	TACHOCALCULATED ROTOR SPEED		
Data Address:	40094	User Name:	Encoder Speed
Data Type:	Read only	Save to EEPROM:	No
Range:	-32768..+32767		
Unit * Scale:	none (Base is: Rated synchronous speed of motor in rpm)		
Refer Elite Screen:	-		
DESCRIPTION:	CURRENT FAULT STATUS		
Data Address:	40095	User Name:	Fault State
Data Type:	Read only	Save to EEPROM:	No
Range:	0..39	Scaled Range:	0..39
Unit * Scale:	none		
Refer Elite Screen:	F, F1..F6		
<i>Special Values:</i>	0 = NO FAULT	No Faults	
	1 = LOW Vdc	Low DC bus voltage	
	2 = HIGH Vdc	High DC bus voltage	
	3 = HI Vdc T/O	High DC bus voltage timeout	
	4 = SUPPLY FLT	Input supply phase voltage imbalance	
	5 = S/W DL FLT	Software download fault	
	6 = EEPROM FLT	EEPROM fault	

7 =	I LIM FLT	Current limit fault
8 =	U+ DESAT	+ve U-phase IGBT desaturation
9 =	V+ DESAT	+ve V-phase IGBT desaturation
10 =	W+ DESAT	+ve W-phase IGBT desaturation
11 =	U- DESAT	-ve U-phase IGBT desaturation
12 =	V- DESAT	-ve V-phase IGBT desaturation
13 =	W- DESAT	-ve W-phase IGBT desaturation
14 =	NEG DESAT	-ve phase IGBT desaturation (on smaller Elites)
15 =	ELITE O/L	Inverter thermal model overload trip
16 =	MOTOR O/L	Motor thermal model overload trip
17 =	BRAKE O/L	Dynamic brake resistor thermal model overload trip
18 =	DATA FLT	EEPROM reading fault (cleared from screen Y2)
19 =	ZERO PARAM	Zero nameplate parameter detected
20 =	PARAM FLT	Inconsistent nameplate parameters detected
21 =	GROUND FLT	Excessive current flow to ground
22 =	EXT/PTC	External/PTC trip
23 =	H/STEMP	Excessive heatsink temperature trip
24 =	INT TEMP	Excessive internal temperature trip
25 =	COMMSTRIP	Host computer generated trip
26 =	COMMST/O	Time since last serial comms exceeds timeout period
27 =	FIBRE T/O	Time since last F/O comms exceeds T/O period
28 =	OVERSPEED	Maximum output speed exceeded
29 =	TQ LIM T/O	Torque limit timeout
30 =	SP LIM T/O	Speed limit timeout
31 =	CAL FLT	Calibration fault
32 =	S/W T/O	Software timeout fault
33 =	LVDC FLT	Low voltage dc supply fault
34 =	VISTA TRIP	Vista generated trip
35 =	NO DISPLAY	Elite display disconnected
36 =	EPLD TRIP	Undetermined fault detected by EPLD
37 =	WATCHDOG	Watchdog trip
38 =	NO VL CNFG	No Vista configuration loaded
39 =	FIBRE TRIP	Trip detected on fibre-optic control network

DESCRIPTION:

FREQUENCYOUTPUT
 Data Address: 40096
 Data Type: Read only
 Range: -250..+250%
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: A6

Save to EEPROM: No
 Scaled Range: -20480..+20480
 (Base is: Rated frequency of motor (screen N3))

DESCRIPTION:

POWEROUTPUT
 Data Address: 40098
 Data Type: Read only
 Range: -400..+400%
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: A5

User Name: Power Out
 Save to EEPROM: No
 Scaled Range: -32768..+32767
 (Base is: Rated power of motor (screen N4))

DESCRIPTION:

VOLTAGEOUTPUT
 Data Address: 40099
 Data Type: Read only
 Range: 0..800%

User Name: O/P Voltage
 Save to EEPROM: No
 Scaled Range: 0..65535

Unit * Scale: % Note 100% = 8192

(Base is: peak phase voltage i.e., $\frac{\sqrt{2}}{\sqrt{3}} \times V_{Line}$)

Refer Elite Screen: A8

DESCRIPTION:

ESTIMATEDMOTORTEMPERATURE
 Data Address: 40100
 Data Type: Read only
 Range: 0..800%
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: A7

User Name: Motor Temperature
 Save to EEPROM: No
 Scaled Range: 0..65535
 (Base is: Rated motor temperature)

DESCRIPTION:

ESTIMATEDINVERTERTEMPERATURE
 Data Address: 40101
 Data Type: Read only

User Name: Inverter Temperature
 Save to EEPROM: No

Range:	0..800%	Scaled Range:	0..65535												
Unit * Scale:	% Note 100% = 8192	(Base is: Rated inverter temperature)													
Refer Elite Screen:	A7														
DESCRIPTION:	ESTIMATED DYNAMIC BRAKE RESISTOR TEMPERATURE														
Data Address:	40102	User Name:	DB Temperature												
Data Type:	Read only	Save to EEPROM:	No												
Range:	0..800%	Scaled Range:	0..65535												
Unit * Scale:	% Note 100% = 8192	(Base is: Rated dynamic brake resistor temperature)													
Refer Elite Screen:	-														
DESCRIPTION:	ENABLE/DISABLE FIBRE-OPTIC COMMUNICATION														
Data Address:	40106	User Name:	Fibre Enable												
Data Type:	Read/Write	Save to EEPROM:	No												
Range:	0..1														
Unit * Scale:	none														
Refer Elite Screen:	-														
DESCRIPTION:	FIBRE OPTIC CONTROL MODE SELECT														
Data Address:	40107	User Name:	Fibre Mode												
Data Type:	Read/Write	Save to EEPROM:	Yes												
Range:	0..5														
Unit * Scale:	none														
Refer Elite Screen:	l8c														
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.														
Special Values:	<table border="0"> <tr> <td>0 = NO CONTROL</td> <td>No response to fibre-optic control</td> </tr> <tr> <td>1 = MASTER</td> <td>Overall control of the fibre-optic network</td> </tr> <tr> <td>2 = SLAVE</td> <td>Full slave control</td> </tr> <tr> <td>3 = SLAVE TRIP</td> <td>Slave control with trip/reset control only</td> </tr> <tr> <td>4 = SLAVE RUN</td> <td>Slave control with run control only</td> </tr> <tr> <td>5 = SLAVE RUN-STP</td> <td>Slave control with run control and stop on local trip</td> </tr> </table>			0 = NO CONTROL	No response to fibre-optic control	1 = MASTER	Overall control of the fibre-optic network	2 = SLAVE	Full slave control	3 = SLAVE TRIP	Slave control with trip/reset control only	4 = SLAVE RUN	Slave control with run control only	5 = SLAVE RUN-STP	Slave control with run control and stop on local trip
0 = NO CONTROL	No response to fibre-optic control														
1 = MASTER	Overall control of the fibre-optic network														
2 = SLAVE	Full slave control														
3 = SLAVE TRIP	Slave control with trip/reset control only														
4 = SLAVE RUN	Slave control with run control only														
5 = SLAVE RUN-STP	Slave control with run control and stop on local trip														
DESCRIPTION:	FIBRE REFERENCE INPUT														
Data Address:	40108	User Name:	Fibre I/P Pin												
Data Type:	Read only	Save to EEPROM:	No												
Range:	-400..+400%	Scaled Range:	-32768..+32767												
Unit * Scale:	none (Base is: Rated Motor Speed or Torque)														
Refer Elite Screen:	-														
DESCRIPTION:	FIBRE REFERENCE OUTPUT														
Data Address:	40110	User Name:	Fibre O/P Pin												
Data Type:	Read only	Save to EEPROM:	No												
Range:	-400..+400%	Scaled Range:	-32768..+32767												
Unit * Scale:	none (Base is: Rated Motor Speed or Torque)														
Refer Elite Screen:	-														
DESCRIPTION:	FIBRE OPTIC COMMUNICATION TIMEOUT														
Data Address:	40113	User Name:	Fibre Timeout												
Data Type:	Read/Write	Save to EEPROM:	Yes												
Range:	0..3														
Unit * Scale:	none														
Refer Elite Screen:	l8d														
Notes:	Fibre Timeout can only be modified when the Elite is OFF.														
Special Values:	<table border="0"> <tr> <td>0 = 1s</td> <td>1 second timeout</td> </tr> <tr> <td>1 = 5s</td> <td>5 second timeout</td> </tr> <tr> <td>2 = 25s</td> <td>25 second timeout</td> </tr> <tr> <td>3 = OFF</td> <td>Disable timeout</td> </tr> </table>			0 = 1s	1 second timeout	1 = 5s	5 second timeout	2 = 25s	25 second timeout	3 = OFF	Disable timeout				
0 = 1s	1 second timeout														
1 = 5s	5 second timeout														
2 = 25s	25 second timeout														
3 = OFF	Disable timeout														
DESCRIPTION:	FIBRE OPTIC INPUT VALUE														
Data Address:	40114	User Name:	Fibre I/P												
Data Type:	Read only	Save to EEPROM:	No												
Range:	-400..+400%	Scaled Range:	-32768..+32767												
Unit * Scale:	% Note 100% = 8192	(Base is: Rated Motor Speed or Torque)													
Refer Elite Screen:	Z11														
DESCRIPTION:	FIBRE OPTIC INPUT LOW SETPOINT														
Data Address:	40116	User Name:	Fibre I/P Lo												
Data Type:	Read/Write	Save to EEPROM:	Yes												
Range:	-400..+400%	Scaled Range:	-32768..+32767												

Unit * Scale: % Note 100% = 8192 (Base is: Rated Motor Speed or Torque)
 Refer Elite Screen: I8a

DESCRIPTION: FIBRE OPTIC INPUT HIGH SETPOINT

Data Address: 40117 User Name: Fibre I/P Hi
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: Rated Motor Speed or Torque)
 Refer Elite Screen: I8b

DESCRIPTION: ANALOGUE INPUT 1 VALUE

Data Address: 40120 User Name: Analogue I/P 1
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: Z3

DESCRIPTION: ANALOGUE INPUT 2 VALUE

Data Address: 40121 User Name: Analogue I/P 2
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: Z4

DESCRIPTION: ANALOGUE OUTPUT 1 VALUE

Data Address: 40122 User Name: Analogue O/P 1
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: Z5

DESCRIPTION: ANALOGUE OUTPUT 2 VALUE

Data Address: 40123 User Name: Analogue O/P 2
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: Z6

DESCRIPTION: ANALOGUE INPUT 1+2 VALUE

Data Address: 40124 User Name: Analogue I/P 1+2
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: -

DESCRIPTION: ANALOGUE INPUT 1 LOW SETPOINT

Data Address: 40125 User Name: Analogue I/P 1 Lo
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: I6b

DESCRIPTION: ANALOGUE INPUT 1 HIGH SETPOINT

Data Address: 40126 User Name: Analogue I/P 1 Hi
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: I6c

DESCRIPTION: ANALOGUE INPUT 2 LOW SETPOINT

Data Address: 40127 User Name: Analogue I/P 2 Lo
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: I6e

DESCRIPTION: ANALOGUE INPUT 2 HIGH SETPOINT

Data Address: 40128 User Name: Analogue I/P 2 Hi
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)

Refer Elite Screen: l6f

DESCRIPTION: ANALOGUE OUTPUT 1 LOW SETPOINT
 Data Address: 40129 User Name: Analogue O/P 1 Lo
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: O1c

DESCRIPTION: ANALOGUE OUTPUT 1 HIGH SETPOINT
 Data Address: 40130 User Name: Analogue O/P 1 Hi
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: O1d

DESCRIPTION: ANALOGUE OUTPUT 2 LOW SETPOINT
 Data Address: 40131 User Name: Analogue O/P 2 Lo
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: O1g

DESCRIPTION: ANALOGUE OUTPUT 2 HIGH SETPOINT
 Data Address: 40132 User Name: Analogue O/P 2 Hi
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: O1h

DESCRIPTION: ZERO BAND OF $\pm 2\%$ FOR ANALOGUE INPUT SOURCES
 Data Address: 40133 User Name: Zero Band
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: l6g
Special Values:
 0=N
 1=Y Zero band for analogue sources selected

DESCRIPTION: ANALOGUE INPUT 1 FORMAT
 Data Address: 40134
 User Name: Analogue I/P 1 Mode
 Data Type: Read/Write
 Save to EEPROM: Yes
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: l6a,Z3
Notes: Analogue I/P 1 Mode can only be modified when the Elite is OFF.
Special Values:
 0 = 0-10V 0 to 10 Vdc
 1 = +/-10V -10 to +10 Vdc
 2 = 4-20mA 4 to 20 mA
 3 = 0-20mA 0 to 20 mA

DESCRIPTION: ANALOGUE INPUT 2 FORMAT
 Data Address: 40135
 User Name: Analogue I/P 2 Mode
 Data Type: Read/Write
 Save to EEPROM: Yes
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: l6d,Z4
Notes: Analogue I/P 2 Mode can only be modified when the Elite is OFF.
Special Values: Refer data address 40134

DESCRIPTION: ANALOGUE OUTPUT 1 FORMAT
 Data Address: 40136 User Name: Analogue O/P 1 Mode
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: O1b,Z5

Notes: Analogue O/P 1 Mode can only be modified when the Elite is OFF.

Special Values:
 0 = 0-10V 0 to 10 Vdc
 1 = +/-10V -10 to +10 Vdc
 2 = 4-20mA 4 to 20 mA
 3 = 0-20mA 0 to 20 mA

DESCRIPTION: ANALOGUE OUTPUT 2 FORMAT

Data Address: 40137 User Name: Analogue O/P 2 Mode
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..3
 Unit * Scale: none
 Refer Elite Screen: O1f,Z6

Notes: Analogue O/P 2 Mode can only be modified when the Elite is OFF.

Special Values: Refer data address 40136

DESCRIPTION: MULTI-FUNCTION INPUT LOGICAL INVERSION

Data Address: 40138 User Name: I/P Polarity
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: I7b

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

Special Values:
 0 = LOW Active low
 1 = HIGH Active high

DESCRIPTION: ENCODER TYPE SELECT

Data Address: 40139 User Name: Encoder Type
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: N9

Notes: Encode Type can only be modified when the Elite is OFF.

Special Values:
 0 = DIFF Differential encoder
 1 = SING Single-ended encoder

DESCRIPTION: SOFTWARE VERSION

Data Address: 40140 User Name: Software Version
 Data Type: Read only Save to EEPROM: No
 Range: 0..25.5 Scaled Range: 0..255
 Unit * Scale: Version*10
 Refer Elite Screen: Z2

DESCRIPTION: HARDWARE VERSION

Data Address: 40141 User Name: Hardware Version
 Data Type: Read only Save to EEPROM: No
 Range: 0..25.5 Scaled Range: 0..255
 Unit * Scale: none
 Refer Elite Screen: Z2

DESCRIPTION: SCREEN LIST SELECT

Data Address: 40150 User Name: Screen List
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..255
 Unit * Scale: none
 Refer Elite Screen: Y1

Special Values:
 0=ENGLISH
 1=DEUTSCH
 2=ESPANOL

DESCRIPTION: CURRENT VISTA CONFIGURATION SELECT

Data Address: 40151 User Name: Program
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..255
 Unit * Scale: none
 Refer Elite Screen: Y3

Notes: Program can only be selected when the Elite is OFF.

DESCRIPTION: NUMBER OF VISTA CONFIGURATIONS

Data Address: 40152 User Name: Number of Programs
 Data Type: Read only Save to EEPROM: No
 Range: 0..255

Unit * Scale:	none		
Refer Elite Screen:	Y3		
DESCRIPTION:	ERROR CODE RETURNED BY VISTA BLOCK		
Data Address:	40153	User Name:	Block Error
Data Type:	Read only	Save to EEPROM:	No
Range:	0..255		
Unit * Scale:	none		
Refer Elite Screen:	-		
DESCRIPTION:	REFERENCESPEED		
Data Address:	40161	User Name:	Ref Speed
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192		<i>(Base is: Rated synchronous speed of motor in rpm)</i>
Refer Elite Screen:	A4		
DESCRIPTION:	REFERENCETORQUE		
Data Address:	40162	User Name:	Ref Torque
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192		<i>(Base is: Rated output Torque of motor)</i>
Refer Elite Screen:	A4		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 1		
Data Address:	40170	User Name:	Multifunction I/P 1
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1	Unit * Scale:	none
Refer Elite Screen:	Z7		
<i>Special Values:</i>	0 = O (open) 1 = X (closed)		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 2		
Data Address:	40171	User Name:	Multifunction I/P 2
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	Z7		
<i>Special Values:</i>	0 = O (open) 1 = X (closed)		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 3		
Data Address:	40172	User Name:	Multifunction I/P 3
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	Z7		
<i>Special Values:</i>	0 = O (open) 1 = X (closed)		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 4		
Data Address:	40173	User Name:	Multifunction I/P 4
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	Z7		
<i>Special Values:</i>	0 = O (open) 1 = X (closed)		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 5		
Data Address:	40174	User Name:	Multifunction I/P 5
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	Z7		
<i>Special Values:</i>	0 = O (open) 1 = X (closed)		
DESCRIPTION:	STATUS OF MULTIFUNCTION INPUT 6		
Data Address:	40175	User Name:	Multifunction I/P 6
Data Type:	Read only	Save to EEPROM:	No

Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: Z7
Special Values:
 0 = O (open)
 1 = X (closed)

DESCRIPTION: STATUS OF MULTIFUNCTION INPUT 7 / EXTERNAL TRIP
 Data Address: 40176 User Name: External Trip
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: Z7
Special Values:
 0 = O (open)
 1 = X (closed)

DESCRIPTION: ELITE STOP SIGNAL
 Data Address: 40180 User Name: Stop
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
Special Values:
 0 = stop not active
 1 = stop active

DESCRIPTION: ELITE START SIGNAL
 Data Address: 40181 User Name: Start
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
Special Values:
 0 = start not active
 1 = start active

DESCRIPTION: ELITE RESET SIGNAL
 Data Address: 40182 User Name: Reset
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
Special Values:
 0 = reset not active
 1 = reset active

DESCRIPTION: ELITE RUN COMMAND
 Data Address: 40183 User Name: Run
 Data Type: Read/Write Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
Special Values:
 0 = run command not active
 1 = run command active

DESCRIPTION: SKIP SPEED 1
 Data Address: 40190 User Name: Skip Speed 1
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..+250% Scaled Range: -20480..+20480
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
 Refer Elite Screen: L10

DESCRIPTION: SKIP SPEED 2
 Data Address: 40191 User Name: Skip Speed 2
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..+250% Scaled Range: -20480..+20480
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
 Refer Elite Screen: L11

DESCRIPTION: SKIP BANDWIDTH
 Data Address: 40192 User Name: Skip Bandwidth

Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..20% Scaled Range: 0..1638
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
 Refer Elite Screen: L12

DESCRIPTION: CLEARFAULTHISTORY

Data Address: 40200 User Name: Clear Fault History
 Data Type: Read/Write Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: F6
Special Values: 0=N
 1=Y

DESCRIPTION: FAULTHISTORY 1

Data Address: 40201 User Name: Fault History 1
 Data Type: Read only Save to EEPROM: No
 Range: 0..39
 Unit * Scale: none
 Refer Elite Screen: F1
Special Values: Refer to data address 40095

DESCRIPTION: FAULTHISTORY 2

Data Address: 40202 User Name: Fault History 2
 Data Type: Read only Save to EEPROM: No
 Range: 0..39
 Unit * Scale: none
 Refer Elite Screen: F2
Special Values: Refer to data address 40095

DESCRIPTION: FAULTHISTORY 3

Data Address: 40203 User Name: Fault History 3
 Data Type: Read only Save to EEPROM: No
 Range: 0..39
 Unit * Scale: none
 Refer Elite Screen: F3
Special Values: Refer to data address 40095

DESCRIPTION: FAULTHISTORY 4

Data Address: 40204 User Name: Fault History 4
 Data Type: Read only Save to EEPROM: No
 Range: 0..39
 Unit * Scale: none
 Refer Elite Screen: F4
Special Values: Refer to data address 40095

DESCRIPTION: FAULTHISTORY 5

Data Address: 40205 User Name: Fault History 5
 Data Type: Read only Save to EEPROM: No
 Range: 0..39
 Unit * Scale: none
 Refer Elite Screen: F5
Special Values: Refer to data address 40095

DESCRIPTION: DYNAFLUXMINIMUMFLUXLEVEL

Data Address: 40210 User Name: Min Flux Level
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 40..100% Scaled Range: 3276..8192
 Unit * Scale: % Note 100% = 8192
 Refer Elite Screen: X4a

DESCRIPTION: SELECTTORQUEBOOSTMODE

Data Address: 40211 User Name: Autoboot
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..2
 Unit * Scale: none
 Refer Elite Screen: X4b
Special Values: 0 = Fixed voltage boost
 1 = Auto voltage boost
 2 = Controlled current boost

DESCRIPTION:	CURRENT LIMIT SLIP VALUE		
Data Address:	40212	User Name:	Current Limit Slip
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..10%	Scaled Range:	0..901
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5a		
<i>Special Values:</i>	11% = OFF 901 = OFF, Disable current limit slip		
DESCRIPTION:	VOLTAGE LIMIT SLIP VALUE		
Data Address:	40213	User Name:	Voltage Limit Slip
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..20%	Scaled Range:	0..1638
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5b		
DESCRIPTION:	NO-LOAD DAMPING		
Data Address:	40214	User Name:	Damping
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..20%	Scaled Range:	0..1638
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	X5c		
DESCRIPTION:	SLIP COMPENSATION		
Data Address:	40215	User Name:	Slip Compensation
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1	Scaled Range:	0..1
Unit * Scale:	none		
Refer Elite Screen:	X5d		
DESCRIPTION:	PROCESS CONTROL ERROR SIGNAL		
Data Address:	40220	User Name:	Process Error
Data Type:	Read only	Save to EEPROM:	No
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192		
Refer Elite Screen:	P6		
DESCRIPTION:	PROCESS CONTROL ENABLE		
Data Address:	40221	User Name:	Process Enable
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	-		
<i>Special Values:</i>	0 = process control not active 1 = process control active		
DESCRIPTION:	PROCESS CONTROL REFERENCE VALUE		
Data Address:	40222	User Name:	Process Reference
Data Type:	Read only	Save to EEPROM:	No
Range:	-32768..+32767		
Unit * Scale:	none		
Refer Elite Screen:	-		
DESCRIPTION:	PROCESS CONTROL FEEDBACK VALUE		
Data Address:	40223	User Name:	Process Feedback
Data Type:	Read only	Save to EEPROM:	No
Range:	-32768..+32767		
Unit * Scale:	none		
Refer Elite Screen:	-		
DESCRIPTION:	PROCESS CONTROL REFERENCE SOURCE SELECT		
Data Address:	40224	User Name:	Process Ref Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..7		
Unit * Scale:	none		
Refer Elite Screen:	P1		
<i>Special Values:</i>	0 = NULL No source selected 1 = AIN1 Analogue Input 1 2 = AIN2 Analogue Input 2		

- 3 = AIN1+2 Addition of Analogue Inputs 1 and 2
 4 = FIBRE Fibre-optic Input
 5 = LOCAL Keyboard
 6 = MREF Multi-reference Input
 7 = MTRPOT Motorised Potentiometer

DESCRIPTION: PROCESS CONTROL FEEDBACK SOURCE SELECT
 Data Address: 40225 User Name: Process Fb Select
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..7
 Unit * Scale: none
 Refer Elite Screen: P2
Special Values:
 0 = NULL No source selected
 1 = AIN1 Analogue Input 1
 2 = AIN2 Analogue Input 2
 3 = AIN1+2 Addition of Analogue Inputs 1 and 2
 4 = FIBRE Fibre-optic Input

DESCRIPTION: PROCESS CONTROL GAIN FACTOR
 Data Address: 40226 User Name: Process Kc
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0.1..10 Scaled Range: 1..100
 Unit * Scale: none
 Refer Elite Screen: P3

DESCRIPTION: PROCESS CONTROL INTEGRATION TIME
 Data Address: 40227 User Name: Process Ti
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 1..1000s/OFF Scaled Range: 10..10010
 Unit * Scale: s x 10
 Refer Elite Screen: P4
Special Values:
 10010 = INF Infinite integration time

DESCRIPTION: PROCESS CONTROL DIFFERENTIAL FACTOR
 Data Address: 40228 User Name: Process Td
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..250s Scaled Range: 0..2500
 Unit * Scale: s x 10
 Refer Elite Screen: P5

DESCRIPTION: INVERT PROCESS CONTROL
 Data Address: 40229 User Name: Inv Process Kc
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: P7

Notes:
 This flag inverts the output action of the Process control PID block. In systems where a positive output Speed moves the system towards a positive set point e.g. a tank filling system, then the default No value is used. In systems where a positive output Speed moves the system away from the set point e.g. a tank emptying system, then the system can be inverted.

DESCRIPTION: INVERT RATED VOLTAGE
 Data Address: 40230 User Name: Drive rated voltage
 Data Type: Read only Save to EEPROM: No
 Range: 400,690
 Unit * Scale: volts
 Refer Elite Screen: -

DESCRIPTION: INVERT RATED CURRENT
 Data Address: 40231 User Name: Drive rated current
 Data Type: Read only Save to EEPROM: No
 Range: 0..6553 Scaled Range: 0..65535
 Unit * Scale: Amps x 10
 Refer Elite Screen: -

DESCRIPTION: DRIVE IDENTIFICATION CODE
 Data Address: 40613 User Name: Drive ID
 Data Type: Read only Save to EEPROM: No
 Range: 0..65535 Scaled Range: -

Unit * Scale: none
 Refer Elite Screen: -

Note 1: 40613 - Drive Identification Code

High Byte:	1 = Microdrive	Low Byte:	1 = ME-2.5, 400V	35 = UE-60, 400V
	2 = Microflo		33 = ME-6.5, 400V	67 = UE-75, 400V
	3 = Microvector		65 = ME-10.5, 400V	129 = UE-90, 400V
	4 = Elite Series		97 = ME-12, 400V	36 = UE-115, 400V
	5 = Xtravert		96 = ME-16, 400V	68 = UE-140, 400V
			64 = ME-18, 400V	32 = UE-170, 400V
			128 = ME-22.5, 400V	69 = UE-210, 400V
			42 = ME-28, 400V	98 = UE-250, 400V
			34 = ME-31, 400V	37 = UE-305, 400V
			66 = ME-38, 400V	72 = UE-340, 400V
			2 = ME-46, 400V	41 = UE-420, 400V
				38 = UE480, 400V
				40 = UE575, 400V
				39 = UE-660, 400V

DESCRIPTION: EEPROMADDRESS

Data Address: 40885 User Name:
 Data Type: Read only Save to EEPROM: No
 Range: 40001..49999 (excluding 40885)
 Unit * Scale: none
 Refer Elite Screen: -

Notes: The EEPROM address is used to select a variable by its Modbus data address for storage into permanent EEPROM memory.

DESCRIPTION: MULTI-FUNCTION INPUT 1 SELECT

Data Address: 41001 User Name: MFI 1 Select
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..18
 Unit * Scale: none
 Refer Elite Screen: I7c

Notes: MFI 1 Select can only be modified when the Elite is OFF.

Special Values:

0 = UNUSED	Unused
1 = START	Start
2 = STOP	Stop
3 = ALT STOP	Alternative Stop
4 = STOP-RESET	Stop-Reset
5 = START/STOP	Start/Stop
6 = STP/STRT-RST	Stop/Start-Reset
7 = RESET	Reset
8 = INCH 1	Inch 1
9 = INCH 2	Inch 2
10 = INV SPEED	Invert Speed Reference
11 = INV TORQUE	Invert Torque Reference
12 = INV TRQ/SPD	Invert Torque/Speed Reference
13 = INV INCH	Invert Inch
14 = ALT ACCEL	Alternative Acceleration/Deceleration Rate
15 = ALT REF	Alternative Reference
16 = SP/TQ MODE	Speed/Torque Mode
17 = LOCAL/REMOTE	Local/Remote
18 = STRT/STP-RST	Start/Stop-Reset

DESCRIPTION: MULTI-FUNCTION INPUT 2 SELECT

Data Address: 41002 User Name: MFI 2 Select
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..18
 Unit * Scale: none
 Refer Elite Screen: I7d

Notes: MFI 2 Select can only be modified when the Elite is OFF.

Special Values: Refer data address 41001.

DESCRIPTION: MULTI-FUNCTION INPUT 3 SELECT

Data Address: 41003 User Name: MFI 3 Select
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..18

Unit * Scale: none
Refer Elite Screen: I7e
Notes: MFI 3 Select can only be modified when the Elite is OFF.
Special Values: Refer data address 41001.

DESCRIPTION: MULTI-FUNCTION INPUT 4 SELECT
Data Address: 41004 User Name: MFI 4 Select
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..18
Unit * Scale: none
Refer Elite Screen: I7f
Notes: MFI 4 Select can only be modified when the Elite is OFF.
Special Values: Refer data address 41001.

DESCRIPTION: MULTI-FUNCTION INPUT 5 SELECT
Data Address: 41005 User Name: MFI 5 Select
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..18
Unit * Scale: none
Refer Elite Screen: I7g
Notes: MFI 5 Select can only be modified when the Elite is OFF.
Special Values: Refer data address 41001.

DESCRIPTION: MULTI-FUNCTION INPUT 6 SELECT
Data Address: 41006 User Name: MFI 6 Select
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..18
Unit * Scale: none
Refer Elite Screen: I7h
Notes: MFI 6 Select can only be modified when the Elite is OFF.
Special Values: Refer data address 41001.

DESCRIPTION: MULTI-FUNCTION INPUT MODE SELECT
Data Address: 41007 User Name: I/P Mode
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..5
Unit * Scale: none
Refer Elite Screen: I7a
Notes: I/P Mode can only be modified when the Elite is OFF.
Special Values: 0 = LOCAL Disable all multi-function inputs
1 = 3 WIRE Standard 3-wire control
2 = ALL PROG Each of the multi-function inputs are individually programmable
3 = MULTIREF 2WRE Multi-reference 2 Wire
4 = MULTIREF 3WRE Multi-reference 3 Wire
5 = MOTOR POT Motorised Potentiometer

DESCRIPTION: COMPARATOR 1 "ON" SETPOINT
Data Address: 41010 User Name: Comp 1 On
Data Type: Read/Write Save to EEPROM: Yes
Range: -250..+250% Scaled Range: C1 OFF..+20480
Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
Refer Elite Screen: C2
Notes: Valid values are from Comp 1 OFF to +250%

DESCRIPTION: COMPARATOR 1 "OFF" SETPOINT
Data Address: 41011 User Name: Comp 1 Off
Data Type: Read/Write Save to EEPROM: Yes
Range: -250..+250% Scaled Range: -20480..C1 ON
Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
Refer Elite Screen: C3
Note: Valid values are from -250% to Comp 1 ON

DESCRIPTION: COMPARATOR 1 SOURCE SELECT
Data Address: 41012 User Name: Comp 1 Select
Data Type: Read/Write Save to EEPROM: Yes
Range: 0..18
Unit * Scale: none
Refer Elite Screen: C1

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

Special Values:

0	=	NULL	No source selected
1	=	FULL SCALE	100% of full scale
2	=	OUTPUT CURR	Output Current
3	=	OUTPUTVOLTS	Output Volts
4	=	BUSVOLTAGE	
5	=	MOTORPOWER	
6	=	MOTOR SPEED	
7	=	MOTORTORQUE	
8	=	REF SPEED	
9	=	REF TORQUE	
10	=	MOTORTEMP	
11	=	INVERTER TEMP	
12	=	AIN1 ECHO	
13	=	AIN2 ECHO	
14	=	AIN1+2 ECHO	
15	=	FIBRE ECHO	
16	=	PROCESS REF	
17	=	PROCESS FB	
18	=	PROCESS ERROR	

DESCRIPTION: COMPARATOR 1 OUTPUT

Data Address:	41013	User Name:	Comp 1 Out
Data Type:	Read only	Save to EEPROM:	No
Range:	0..1		
Unit * Scale:	none		
Refer Elite Screen:	-		
Special Values:	0 = Below "OFF" level		
	1 = Above "ON" level		

DESCRIPTION: SPEEDREFERENCE SOURCE SELECT

Data Address:	41014	User Name:	Speed Ref Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..8		
Unit * Scale:	none		
Refer Elite Screen:	I2		

Notes: Speed Ref Select can only be modified when the Elite is OFF.

Special Values:

0	=	NULL	No source selected
1	=	AIN1	Analogue Input 1
2	=	AIN2	Analogue Input 2
3	=	AIN1+2	Addition of Analogue Inputs 1 and 2
4	=	FIBRE	Fibre-optic inout
5	=	LOCAL	Keyboard speed control (refer data register 40088)
6	=	MREF	
7	=	MTRPOT	Motorised potentiometer (refer data address 41062)
8	=	PROCESS	Process control output

DESCRIPTION: TORQUE REFERENCE SOURCE SELECT

Data Address:	41015	User Name:	Torque Ref Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..8		
Unit * Scale:	none		
Refer Elite Screen:	I3		

Notes: Torque Ref Select can only be modified when the Elite is OFF.

Special Values:

0	=	NULL	No source selected
1	=	AIN1	Analogue Input 1
2	=	AIN2	Analogue Input 2
3	=	AIN1+2	Addition of Analogue Inputs 1 and 2
4	=	FIBRE	Fibre-optic inout
5	=	LOCAL	Keyboard torque control (refer data register 41041)
6	=	MREF	Multi-reference input
7	=	MTRPOT	Motorised potentiometer (refer data address 41063)
8	=	PROCES	Control Output

DESCRIPTION: ALTERNATIVE SPEED REFERENCE SOURCE SELECT

Data Address:	41016	User Name:	Alt Speed Select
---------------	-------	------------	------------------

Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..8		
Unit * Scale:	none		
Refer Elite Screen:	I4		
Notes:	Alt Speed Select can only be modified when the Elite is OFF.		
Special Values:	Refer data address 41014.		
DESCRIPTION:	ALTERNATIVE TORQUE REFERENCE SOURCE SELECT		
Data Address:	41017	User Name:	Alt Torque Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..7		
Unit * Scale:	none		
Refer Elite Screen:	I5		
Notes:	Alt Torque Select can only be modified when the Elite is OFF.		
Special Values:	Refer data address 41015.		
DESCRIPTION:	MULTI-REFERENCE SELECT		
Data Address:	41019	User Name:	Multi Ref Select
Data Type:	Read only	Save to EEPROM:	No
Range:	0..255		
Unit * Scale:	none		
Refer Elite Screen:	-		
DESCRIPTION:	MULTI-REFERENCE 1 SETPOINT		
Data Address:	41020	User Name:	Multi Reference 1
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M1		
DESCRIPTION:	MULTI-REFERENCE 2 SETPOINT		
Data Address:	41021	User Name:	Multi Reference 2
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M2		
DESCRIPTION:	MULTI-REFERENCE 3 SETPOINT		
Data Address:	41022	User Name:	Multi Reference 3
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M3		
DESCRIPTION:	MULTI-REFERENCE 4 SETPOINT		
Data Address:	41023	User Name:	Multi Reference 4
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M4		
DESCRIPTION:	MULTI-REFERENCE 5 SETPOINT		
Data Address:	41024	User Name:	Multi Reference 5
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M5		
DESCRIPTION:	MULTI-REFERENCE 6 SETPOINT		
Data Address:	41025	User Name:	Multi Reference 6
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M6		
DESCRIPTION:	MULTI-REFERENCE 7 SETPOINT		
Data Address:	41026	User Name:	Multi Reference 7
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-400..+400%	Scaled Range:	-32768..+32767
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated Motor Speed or Torque)</i>	
Refer Elite Screen:	M7		

DESCRIPTION: **RELAY 1 SOURCE SELECT**

Data Address:	41027	User Name:	Relay 1 Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..23		
Unit * Scale:	none		
Refer Elite Screen:	O2a		
<i>Special Values:</i>	00 = ALWAYS OFF		
	01 = ALWAYS ON		
	02 = NO FAULTS		
	03 = DRIVE FAULT		
	04 = SUPPLY FAULT		
	05 = O/L FAULT		
	06 = O/L WARNING		
	07 = START		
	08 = RUN		
	09 = ZERO SPEED		
	10 = AT SET SPEED		
	11 = TORQUE SIGN		
	12 = SPEED SIGN		
	13 = TQ REF SIGN		
	14 = SP REF SIGN		
	15 = SPEED LIMIT		
	16 = TORQUE LIMIT		
	17 = VOLTAGE LIMIT		
	18 = CURRENT LIMIT		
	19 = COMPARATOR 1		
	20 = COMPARATOR 2		
	21 = WINDOW COMP		
	22 = BRAKE RELEASE		
	23 = VISTA CONTROL		

DESCRIPTION: **RELAY 2 SOURCE SELECT**

Data Address:	41028	User Name:	Relay 2 Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..23		
Unit * Scale:	none		
Refer Elite Screen:	O2c		
<i>Special Values:</i>	Refer data address 41027		

DESCRIPTION: **RELAY 3 SOURCE SELECT**

Data Address:	41029	User Name:	Relay 3 Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..23	Unit * Scale:	none
Refer Elite Screen:	O2e		
<i>Special Values:</i>	Refer data address 41027		

DESCRIPTION: **INVERT THE LOGIC OF RELAY 1**

Data Address:	41030	User Name:	Relay 1 Invert
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1	Unit * Scale:	none
Refer Elite Screen:	O2b		
<i>Special Values:</i>	0=N		
	1=Y Relay logic inverted		

DESCRIPTION: **INVERT THE LOGIC OF RELAY 2**

Data Address:	41031	User Name:	Relay 2 Invert
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1	Unit * Scale:	none
Refer Elite Screen:	O2d		
<i>Special Values:</i>	0=N		
	1=Y Relay logic inverted		

DESCRIPTION: **INVERT THE LOGIC OF RELAY 3**

Data Address:	41032	User Name:	Relay 3 Invert
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1	Unit * Scale:	none
Refer Elite Screen:	O2f		

<i>Special Values:</i>	0=N 1=Y Relay logic inverted		
DESCRIPTION:	ANALOGUE OUTPUT 1 SOURCE SELECTION		
Data Address:	41033	User Name:	Analogue O/P 1 Sel
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..18	Unit * Scale:	none
Refer Elite Screen:	O1a		
<i>Special Values:</i>	0 = NULL 1 = FULL SCALE 2 = OUTPUT CURR 3 = OUTPUT VOLTS 4 = BUS VOLTAGE 5 = MOTOR POWER 6 = MOTOR SPEED 7 = MOTOR TORQUE 8 = REF SPEED 9 = REF TORQUE 10 = MOTOR TEMP 11 = INVERTER TEMP 12 = AIN1 ECHO 13 = AIN2 ECHO 14 = AIN1+2 ECHO 15 = FIBRE ECHO 16 = PROCESS REF 17 = PROCESS FB 18 = PROCESS ERROR		
DESCRIPTION:	ANALOGUE OUTPUT 2 SOURCE SELECTION		
Data Address:	41034	User Name:	Analogue O/P 2 Sel
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..18	Unit * Scale:	none
Refer Elite Screen:	O1e		
<i>Special Values:</i>	Refer data address 41033		
DESCRIPTION:	FIBRE OPTIC OUTPUT SOURCE SELECT		
Data Address:	41039	User Name:	Fibre O/P Select
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..18	Unit * Scale:	none
Refer Elite Screen:	O3a		
<i>Special Values:</i>	Refer data address 41033		
DESCRIPTION:	KEYBOARD TORQUE REFERENCE		
Data Address:	41041	User Name:	KB Torque
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	-250..+250%	Scaled Range:	-20480..+20480
Unit * Scale:	% Note 100% = 8192	<i>(Base is: Rated output Torque of motor)</i>	
Refer Elite Screen:	A2		
DESCRIPTION:	KEYBOARD SPEED/TORQUE MODE SELECT		
Data Address:	41042	User Name:	KB Speed/Torque
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0..1	Unit * Scale:	none
Refer Elite Screen:	A1		
<i>Special Values:</i>	0 = SP Speed mode 1 = TQ Torque mode		
DESCRIPTION:	ACCELERATION RATE		
Data Address:	41043	User Name:	Accel Rate
Data Type:	Read/Write	Save to EEPROM:	Yes
Range:	0.02..1300%/s	Scaled Range:	1..65000
Unit * Scale:	%/s * 50		
Refer Elite Screen:	R1		
DESCRIPTION:	DECELERATION RATE		
Data Address:	41044	User Name:	Decel Rate
Data Type:	Read/Write	Save to EEPROM:	Yes

Range: 0.02..1300%/s Scaled Range: 1..65000
 Unit * Scale: %/s * 50
 Refer Elite Screen: R2

DESCRIPTION: ALTERNATIVE ACCELERATION RATE
 Data Address: 41045 User Name: Alt Accel Rate
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0.02..1300%/s Scaled Range: 1..65000
 Unit * Scale: %/s * 50
 Refer Elite Screen: R3

DESCRIPTION: ALTERNATIVE DECELERATION RATE
 Data Address: 41046 User Name: Alt Decel Rate
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0.02..1300%/s Scaled Range: 1..65000
 Unit * Scale: %/s * 50
 Refer Elite Screen: R4

DESCRIPTION: BREAKSPEED FOR ALTERNATIVE ACCELERATION/DECELERATION
 Data Address: 41047 User Name: Break Speed
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..250% Scaled Range: 0..20480
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
 Refer Elite Screen: R5
Special Values: 0=OFF

DESCRIPTION: USUAL STOPPING MODE
 Data Address: 41048 User Name: Stop Mode
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..5
 Unit * Scale: none
 Refer Elite Screen: S2
Special Values:

- 0 = NORMAL
- 1 = RAMP Ramp stop
- 2 = SPIN Spin stop
- 3 = STOP R Stop-Rate stop
- 4 = OFF Off-stop
- 5 = DC BRK DC braking

DESCRIPTION: ALTERNATIVE STOPPING MODE
 Data Address: 41049 User Name: Alt Stop Mode
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..5
 Unit * Scale: none
 Refer Elite Screen: S4
Special Values: Refer data address 41048

DESCRIPTION: MOTORISED POTENTIOMETER SPEED
 Data Address: 41062 User Name: Motorised Pot Speed
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated synchronous speed of motor in rpm*)
 Refer Elite Screen: -

DESCRIPTION: MOTORISED POTENTIOMETER TORQUE
 Data Address: 41063 User Name: Motorised Pot Torque
 Data Type: Read only Save to EEPROM: No
 Range: -400..+400% Scaled Range: -32768..+32767
 Unit * Scale: % Note 100% = 8192 (*Base is: Rated output Torque of motor*)
 Refer Elite Screen: -

DESCRIPTION: INVERTER AND MOTOR OVERLOAD WARNING
 Data Address: 41090 User Name: Status Overload
 Data Type: Read only Save to EEPROM: No
 Range: 0..16
 Unit * Scale: none
 Refer Elite Screen: Status Line
Special Values:

- 0 = No overload warning
- 1 = i Inverter overload warning
- 2 = m Motor overload warning
- 3 = o Inverter and Motor overload warning

DESCRIPTION: CONTROL MODE SELECT
 Data Address: 41091 User Name: Control Type
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..2
 Unit * Scale: none
 Refer Elite Screen: X1
 Notes: Control Type can only be selected when the Elite is OFF.
 Special Values: 0 = O/L VECTOR Open loop vector
 1 = C/L VECTOR Closed loop vector
 2 = V/Hz V/Hz

DESCRIPTION: COMPARATOR 2 "ON" SETPOINT
 Data Address: 41110 User Name: Comp 2 On
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..+250% Scaled Range: -20480..+20480
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: C5
 Notes: Valid values are from Comp 2 Off to +250%.

DESCRIPTION: COMPARATOR 2 "OFF" SETPOINT
 Data Address: 41111 User Name: Comp 2 Off
 Data Type: Read/Write Save to EEPROM: Yes
 Range: -250..+250% Scaled Range: -20480..+20480
 Unit * Scale: % Note 100% = 8192 (Base is: That of source selected)
 Refer Elite Screen: C6
 Notes: Valid values are from -250% to Comp 2 ON.

DESCRIPTION: COMPARATOR 2 SOURCE SELECT
 Data Address: 41112 User Name: Comp 2 Select
 Data Type: Read/Write Save to EEPROM: Yes
 Range: 0..18
 Unit * Scale: none
 Refer Elite Screen: C4
 Notes: Comparator 2 is turned "ON" if source > Comparator 2 "ON" setpoint. Comparator 2 is turned "OFF" if source <= Comparator 2 "OFF" setpoint
 Special Values: Refer data address 41012

DESCRIPTION: COMPARATOR 2 OUTPUT
 Data Address: 41113 User Name: Comp 2 Out
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
 Special Values: 0 = Below "OFF" level
 1 = Above "ON" level

DESCRIPTION: WINDOW COMPARATOR OUTPUT
 Data Address: 41114 User Name: Window Comp
 Data Type: Read only Save to EEPROM: No
 Range: 0..1
 Unit * Scale: none
 Refer Elite Screen: -
 Special Values: 0 = Outside window
 1 = Inside window

5 APPLICATION INFORMATION

5.1 EXAMPLE START, STOP AND SPEED CONTROL OF THE ELITE USING THE MODBUS SYSTEM

A typical application for a Modbus system would be to control the reference speed and to start and stop the Elite.

5.1.1 SETTING UP THE ELITE SERIAL COMMUNICATIONS CHANNEL

Screen: H3a COMM ADR= 10

Default: 10

Setting: 10

Note: Must be unique for each device on the Modbus network.

Screen: H3b BAUDRATE=9600

Default: 9600

Setting: 9600 (=2)

Note: Must match the baud rate of the Modbus master.

Screen: H2 COMMS T/O=OFF

Default: OFF

Setting: OFF (=3)

Note: Since we are not writing continuously to the Elite, .

5.1.2 SETTING UP THE ELITE FOR CONTROL OVER THE MODBUS SYSTEM

Screen: I2REFS=LOCAL

Default: LOCAL

Setting: LOCAL (=5)

Note: Selects the local (Keyboard) speed as the source for the speed reference.

Screen: I7a I/P MODE=0

Default: DISABLED

Setting: DISABLED (=0)

Note: This disables the external start/stop inputs allowing the Modbus master only to have start/stop control.

5.1.3 TYPICAL MODBUS MESSAGE EXCHANGE

The messages sent and received are detailed below

Note: Actual data sent is shown in **bold**.

1. **Set speed reference to 0%**
 Query: 0AH, 10H, 00H, 57H, 00H, 01H, 02H, **00H, 00H**, D8H, 87H
 Response: 0AH, 10H, 00H, 57H, 00H, 01H, B1H, 62H
2. **Set Host start of the Elite**
 Query: 0AH, 10H, 00H, 51H, 00H, 01H, 02H, **00H, 01H**, 19H, 21H
 Response: 0AH, 10H, 00H, 51H, 00H, 01H, 51H, 63H
3. **Clear Host start of the Elite**
 Query: 0AH, 10H, 00H, 51H, 00H, 01H, 02H, **00H, 00H**, D8H, E1H
 Response: 0AH, 10H, 00H, 51H, 00H, 01H, 51H, 63H
 Note: Release the start condition
4. **Read the Elite status**
 Query: 0AH, 03H, 00H, 58H, **00H, 01H**, 04H, A2H
 Response: 0AH, 03H, 00H, 03H, 5DH, 84H
 Note: Assuming the Elite is in RUN state
5. **Set the speed to 100% (for example)**
 Query: 0AH, 10H, 00H, 57H, 00H, 01H, 02H, **20H, 00H**, C1H, 47H
 Response: 0AH, 10H, 00H, 57H, 00H, 01H, B1H, 62H
 Note: 100% transmitted as 8192, (=2000H)
6. **Set host stop of the Elite**
 Query: 0AH, 10H, 00H, 50H, 00H, 01H, 02H, **00H, 01H**, 18H, F0H
 Response: 0AH, 10H, 00H, 50H, 00H, 01H, 00H, A3H
 Note: Stop condition latched until released.

5.2 CONTROL OF THE ELITE INPUTS AND OUTPUTS USING THE MODBUS SYSTEM

A Modbus master has the ability to directly interface with a process through the Elite digital and analogue I/O.

Digital input is provided by directly reading the Elite multi-function inputs (40170 to 40176). These inputs are NOT latched and so do not retain any information. Use of these registers might include monitoring some form of sensor switch e.g., a proximity or pressure switch.

Digital output is provided by controlling the Elite three output relays' source selection (41027 to 41029). Uses for these registers might include an output indicator lamp, or valve control relay.

Analogue input is provided by reading the two Elite analogue inputs (40120 and 40121), giving the Modbus master direct input from the analogue lines. If these analogue inputs are not used for reference or feedback then uses for these input registers might include monitoring of pressure, temperature or proximity sensors.

Analogue output is provided by setting the Elite analogue output source selection (analogue outputs 1 and 2 source selections are respectively 41033 and 41034), to FULL SCALE (=1), and controlling the gain by setting the low and high set-points for the analogue output (low and high set-points for analogue outputs 1 and 2 are respectively, 40129, 40130, 40131, 40132). The analogue output levels are linearly interpolated between the low and high set-points. Uses for this might include process controlling or remote indication.

5.3 GLOBAL AND GROUP BROADCASTS USING THE MODBUS SYSTEM

When designing a Modbus system that consists of a number of Elites, the system designer often wishes to simultaneously control more than one drive. This might be to do synchronous starting or frequency adjustment, or emergency stopping of all drives. This can be achieved by using a form of addressing known as global broadcast.

GLOBAL BROADCAST EXAMPLE:

If an application requires the same message to be sent to all drives connected on the Modbus system, a global broadcast can be used to simplify the transmission requirements. The global broadcast allows the Modbus master to send one global broadcast message to all drives instead of individual messages to each drive.

To implement a global broadcast, the global broadcast address (address = 0) is used instead of the individual addresses of the connected Elite. When this global address is used, all slave units on the Modbus system respond to the transmitted message but do not issue a response.

An example transmission of a global broadcast is shown below. This example details a synchronous start to all Elites connected to the Modbus system.

Global broadcast of Elite start –

Sent: 00H, 10H, 00H, 51H, 00H, 01H, 02H, **00H, 01H**, 67H, 81H

Received: No reply received from broadcasts.

In addition to the global broadcast addressing mode, the Elite will respond to a reduced subset of the global broadcast, known as the group broadcast. This form of addressing allows the Modbus master to control a group of drives simultaneously. Group addressing is very similar in operation to global addressing but uses a unique pre-defined address for each group of Elite connected to the Modbus system. Refer to Fig. 3.6 for the pre-defined group broadcast addresses.

GROUP BROADCAST EXAMPLE:

For example, a production plant has two conveyers each with four Elites controlling four motors. All the Elites are connected to a Modbus serial comms system. The Modbus System Designer wishes to control the speed of the conveyers separately yet still have the capability of starting and stopping all Elites synchronously. The simplest way to accomplish this would be to group the Elites from each conveyer into one Modbus group.

Conveyer No. 1: Assign Elite communication addresses of 1, 2, 3, 4

Conveyer No. 2: Assign Elite communication addresses of 17, 18, 19, 20

With this system in place, the Modbus master can start and stop all drives simultaneously by using the global broadcast address (0) while still retaining flexibility to control the speed of each conveyer separately by using the different group broadcast addresses (241 and 242 - refer to Fig. 3.6).

APPENDIX A - THE PHYSICAL LINK

The Elite can be physically connected to a twisted pair RS485 multi-drop system. Refer to Fig. 2.2 for an example wiring configuration.

If the Modbus master does not have RS485 I/O capabilities, an RS232 port can be substituted but an RS232/RS485 converter must also be used.

The RS485 system used on the Elite has the same twisted pair for receiving (Rx) and transmitting (Tx) - this allows an RS485 system to operate only in half duplex mode. Half duplex mode means that the master controller can transmit and receive data but not simultaneously. To control the flow of information across a half duplex system, there must be some form of flow control to indicate to the slave unit when the master controller is transmitting and receiving.

The RS232 control line normally used to do this flow control is the Request-To-Send (RTS) line. The RTS flow control line is normally present along with the Rx and Tx lines at the RS232 I/O port of the Modbus master.

The RTS line must be connected to the RS232/RS485 converter so that the half duplex system can transmit and receive data correctly. In this way, the RS232/RS485 converter is not just a voltage converter but also a full/half duplex converter. For the full/half duplex conversion to work, the Modbus master software must switch the RTS control line at the correct times to control transmitting and receiving over the RS485 half duplex system. A typical wiring configuration for a Modbus master with RS232 I/O capabilities is shown in Fig. A.1. When the Modbus master wishes to transmit, the RTS control line must be asserted "LOW". This enables the transmitter (and normally disables the receiver) of the RS232/RS485 converter.

When the Modbus master wishes to receive a reply back from a Elite slave unit, the RTS control line must be left "HIGH". This enables the receiver (and normally disables the transmitter) of the RS232/RS485 converter.

For an example timing diagram, refer to Fig. A.2.

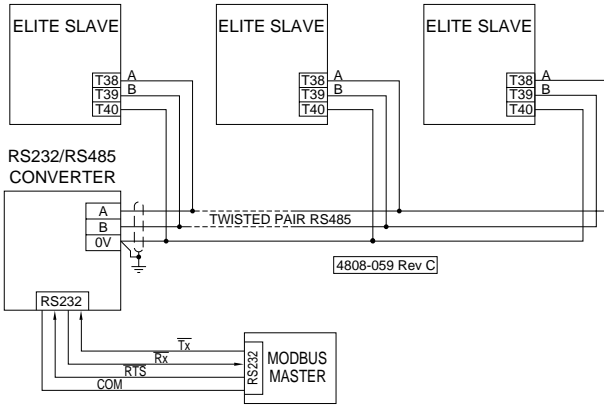
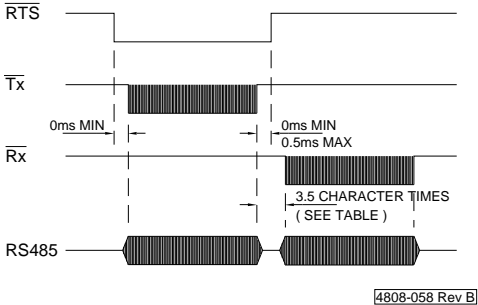


Fig. A1: RS232/RS485 Wiring Configuration



BAUD RATE	3.5 CHARACTER TIMES
1200 BAUD	32ms
4800 BAUD	8ms
9600 BAUD	4ms

Fig. A.2 Typical RS232/RS485 Conversion Timing Diagram

APPENDIX B -**THE MODBUS PROTOCOL****B.1 REMOTE TERMINAL UNIT (RTU) FRAMING**

With RTU framing, data is transmitted and received in 8-bit binary sections. Where 16-bit data is to be transmitted it is split into two 8-bit sections, with the most significant byte being transmitted first.

If more than three and a half character times elapse between receiving each byte within a Modbus message, the Elite will flush its data buffer and assume that the next byte received will be a Modbus Address.

The Elite will always wait at least three and a half character times before replying back with an acknowledgement.

B.2 ADDRESS FIELD

The address field of the Modbus message is 8-bits in length allowing the Elite an address range of 1-240 for individual addresses, 241-255 for group broadcast addresses, and zero (0) for the global broadcast address. Each Elite must have a unique Modbus address assigned to it for the master controller to be able to communicate correctly.

All Elite slave units will interpret and execute a group or global broadcast message, but will not respond.

B.3 FUNCTION FIELD

The Modbus function field indicates to the addressed Elite slave unit what function should be performed.

When the slave unit detects that a communication error has occurred, the most significant bit of the function field is set when transmitting back to the master to indicate that other than a normal response has been sent. Refer to Appendix B.6 for more information on exception responses.

B.4 DATA FIELD

The data field is used to transmit data to and from the Elite slave units. All data fields are of 16-bits in length (transmitted as two 8-bit bytes - with the most significant byte being transmitted first).

B.5 ERROR CHECK FIELD

The error check field is used by the Modbus master and the Elite slave units to detect transmission errors. To detect transmission errors between the sender and the receiver an error check field is added to the message sent. The error detection system used by the Modbus RTU framing is a cyclic redundancy check (CRC). This is implemented using the CRC-16 polynomial $x^{16} + x^{15} + x^2 + 1$.

The receiver will calculate the CRC error check field over the incoming message and compare it against the one received. On mismatch, the whole message will be discarded. It is not possible to recover faults within the message.

THEORY

The bare message without start/stop or parity bits is considered as one continuous number whose most significant bit is transmitted first. The message is pre-multiplied by 2^{16} (shifted 2 bytes left) and then divided by the polynomial shown above. The quotient is discarded and the 16 bit remainder is appended to the message. The remainder is pre-initialised to 0FFFFH to avoid the case of all zeros being an accepted message.

The receiver does a division with the same polynomial on the message (including the received CRC) and will get a zero remainder if no errors have occurred.

The device used to serialise the data for transmission will send the conventional LSB or right most bit of each character first. In generating the CRC, the first bit transmitted is defined as the MSB of the dividend. For convenience then, and since there are no carries used in arithmetic, let's assume that the MSB is on the right. To be consistent, the bit order of the generating polynomial must be reversed. The MSB is dropped since it affects only the quotient and not the remainder. So the original $x^{16} + x^{15} + x^2 + 1$ represented as 1100000000000101 results in the polynomial 1010 0000 0000 0001 (A001H).

PSEUDOCODE FOR GENERATING A CRC-16

```

CONST ARRAY BUFFER      = 0AH, 03H, 00H, 6DH, 00H, 03H
CONST WORD POLYNOMIAL  = 0A001H /*X16 = X15 + X2 + 1*/
CONST INTEGER LENGTH   = 6 /*Length of the message here*/

VAR WORD                CRC16 = 0FFFFH /*Init. for the CRC Accumulator*/
VAR INTEGER i, j        /*loop variables*/

For i := 1 TO length DO /*process the data buffer*/
  data := buffer [i] ; /*get the data byte*/
  FOR j:= 1 TO 8 DO /*process all bits*/
    IF ((data XOR crc16) AND 0001H) = 1) THEN
      crc16 := (crc16 shr 1) XOR POLYNOMIAL
    ELSE
      crc16 := crc16 shr 1
    ENDF
    Data := Data shr 1 /*get the next data bit*/
  NEXT j /*bit loop*/
NEXT i /*byte loop*/

```

In the above example with the input data (0AH, 03H, 00H, 6DH, 00H, 03H) the CRC-16 will be 6D95H which will be appended to the message as 95H, 6DH. The transmitted message will be 0AH, 03H, 00H, 6DH, 03H, 95H, 6DH. To check for transmission errors, the receiver calculates the CRC (using the polynomial A001H) over all eight incoming bytes. If the result is not zero, then a transmission error has occurred.

B.6 EXCEPTION CODES

Protocol errors, and data range errors result in the Elite replying back with an exception response message. An exception response consists of the slave address which detected the error, the function code received by the slave unit (with the most significant bit set to indicate an exception response), the error code, and the error check field.

Refer to Fig. B.1 for a list of the exception codes and their causes.

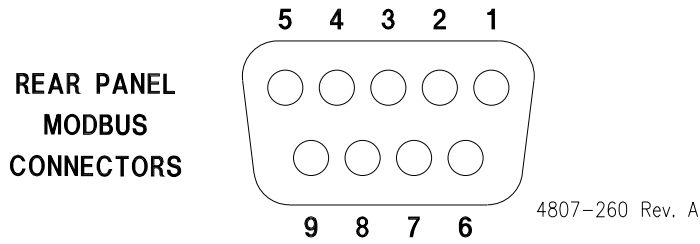
CODE	NAME	CAUSE
01	Illegal Function	The function field received by the slave unit is out of range. The Elite allowable range is Function Codes 3 and 16.
02	Illegal Data Address	The data address received by the slave unit is out of range.
03	Illegal Data Value	The data value received by the slave unit is out of range. If the Elite is not stopped, Modbus Function 16 will return this exception code when trying to modify certain Elite operating modes (40107, 40117, 40135-40139, 41001-41007, 41014-41016).
06	Busy, Reject Message	The slave unit could not complete the required function immediately. Re-transmit again.
07	Negative Acknowledge	The function requested could not be performed.

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Fig. B.1. Modbus Exception Codes

APPENDIX C - TYPICAL CONNECTION DIAGRAMS

Pin out and connections for the 9 pin serial output of IBM compatible PCs.



Pin	Connection	Pin	Connection
1	- CHASSIS GROUND	6	IN DATA SET READY
2	IN RECEIVE DATA	7	OUT REQUEST TO SEND
3	OUT TRANSMIT DATA	8	IN CLEAR TO SEND
4	OUT DATA TERMINAL READY	9	- NOT USED
5	- SIGNAL GROUND		

Fig. C.1 DB9 Connection Pinout

PC CONNECTION LEAD:

Male DB9 Plug:

ELITE RS232 CONNECTIONS:

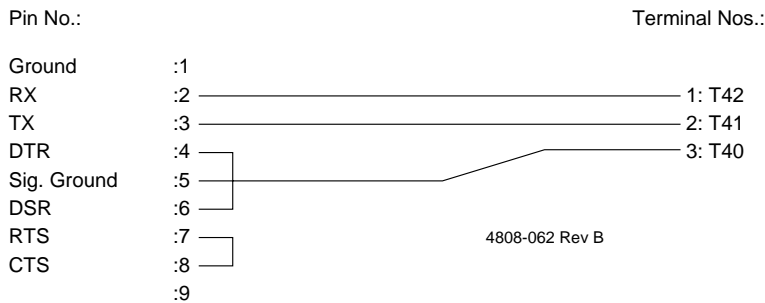


Fig. C.2 DB9/Elite Wiring Connections

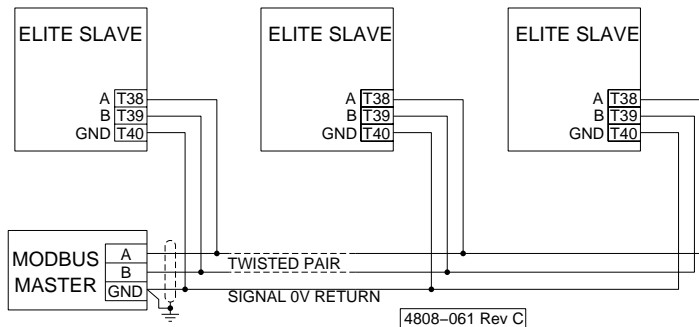


Fig. C.3 RS485 Pin Connection Details

Specifications are subject to change without notice.

4880-012 Rev G

Manufactured by:

PDL ELECTRONICS LTD



Distributed by:

Head Office: 81 Austin Street, Napier, New Zealand.

Tel: +64-6-843-5855 Fax: +64-6-843-5185

Sales branch offices in Auckland, Christchurch and Wellington.

FREEPHONE: 0800-PDL-HELP (0800-735-4357 New Zealand only)

Internet: www.pdl.co.nz

Australia: Sales branch offices in Adelaide, Brisbane, Perth and Sydney.

Melbourne Head Office: Tel: +61-3-9250-1100 Fax: +61-3-9250-1349

Customer Service Hotline: 1800-644-677 (Australia only)

Germany: Nuremberg Tel: +49-9128-91990 Fax: +49-9128-919980

24 Hour Hotline: 0171-8530-649 (Germany only)

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