Flexible Solutions

6180 AeroDAQ

Unique features

The key features of the 6180AeroDAQ are:

- Color touchscreen display
- USB “plug & play”
- Universal Inputs
- 125 ms parallel sampling
- Compact Flash
- Modbus RTU
- Ethernet TCP/IP
- EtherNet/IP server

eurotherm.com/aerodaq

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6180 AeroDAQ

The 6180 AeroDAQ has been designed to meet the specifications of the aerospace industry. Automated scheduling of TUS (Temperature Uniformity Survey), SAT (System Accuracy Test), and instrument calibration is handled by the AeroDAQ based on furnace class and instrument type as per the relevant AMS2750E tables. A service display page clearly shows the number of days until the next activity is due with messages to alert that the due date is approaching.

Additionally, the AeroDAQ also monitors 'control' thermocouple life for number of days used, and 'load' thermocouples for both number of days used and number of uses. A pre-batch thermocouple life check will indicate the availability of the thermocouples for the next batch returning either OK or will indicate non-compliance with the reason (either days or uses will expire). Data is stored in a tamper-resistant binary format that can be used as a long term record of your process. The high accuracy, low drift input boards enable the AeroDAQ to meet the requirements of AMS2750E for Class 1 Furnace.

Paperless/ Graphic Recorder	
Features	**6100AeroDAQ**
Display	12.1" XGA
Channels	6
Relays	3
Groups	6 Standard
Auditor Features	Audit trail
Virtual Channels**	36
Timers	Fitted as standard
Alarms	4 per channel
Batch	Standard
Bridge-Remote Viewing Software	Full as standard
Screen Builder	Standard
Modbus Master	Standard
Security	Unlimited unique user names with configurable access permissions and passwords
Configuration Software	Standard
Review/Quickchart Lite Software	Standard
Standard Views	Vertical and horizontal trending, vertical and horizontal bargraphs, circular trend and numeric values

* Standard AeroDAQ features shown. Additional options available as per ordering code
** Virtual channels can be configured as math, totalizers, counters, or comms

Data Logging and Archiving

The AeroDAQ recorders have internal Flash memory for data storage. They are also able to accept various removable media types (Compact Flash or USB memory stick). Data stored within the internal memory can be archived to the removable media on demand or at preset intervals. The AeroDAQ recorders will give an indication of how long its internal memory and that of the removable media installed will last according to the configuration of the recorder.

All AeroDAQ recorders have Ethernet capability. They can be configured to archive to the removable media and/or over Ethernet. Archiving files over Ethernet effectively gives an infinite archiving capacity.

Approximate duration for continuous recording of one group of six channels, high compression:

Archive Media	Sample Rate						
	0.125s	0.5s	1s	5s	10s	30s	60s
96Mb Internal Flash (approx. 12 million samples)	8.49 days	33.9 days	67.8 days	339 days	1.85 yrs	5.5 yrs	11.1 yrs
256Mb CF Card or USB memory stick (approx, 32 million samples)	22.6 days	90.6 days	181 days	2.4 yrs	4.9 yrs	14.8 yrs	20 yrs
8Gb CF Card or USB memory stick (approx. 1000 million samples)	1.9 yrs	7.8 ys	15.2 yrs	76.8 yrs	152 yrs	464 yrs	928 yrs
Ethernet (SFTP/ FTP Server)	Infinite						

Time Synchronization (SNTP)

The AeroDAQ Recorder supports Simple Network Time Protocol which, when enabled, updates the instrument time every 15 minutes from the configured SNTP server. The unit can also act as a Unicast SNTP server on the network, allowing client instruments to synchronize with the recorder to a resolution of one millisecond.

Batch Recording

Up to ten user-defined fields can be used to enter batch specific data.

Field Descriptor	Operator Entered Batch Information
up to 20 characters	up to 60 characters

The user can choose to log any number of the given fields on start and/or stop of a batch. The information will appear on the chart as a message and cannot be separated from the process data to which it relates.

Audit Trail

Standard on the AeroDAQ Recorder is a time stamped audit trail. This allows all actions taken on the recorder including all user logins, batch start and stop, TUS, SAT and calibration reset, and any configuration changes to be shown on the “chart” as well as becoming a permanent part of the history file. The audit trail information can be seen in historic views of the data.

Modbus Master

Allows users to view data from multiple instruments connected either by a local Network connection using Modbus TCP, or a Serial connection using Modbus RTU.

ASCII Printer Output (Reports)

Fitted as standard, the ASCII text printer option provides the AeroDAQ Recorder with the ability to generate up to 10 simple reports that can be directed to a Serial ASCII text printer. Reports, triggered by an event/job can be configured to contain parameters such as time and date, batch names, process values, and user defined messages.

Dynamic Host Configuration Protocol (DHCP)

Dynamic Host Configuration Protocol, the successor to BootP, allows an AeroDAQ host to obtain Network parameters, such as IP address, Subnet Mask, default gateway and DNS server address dynamically. The implementation of DHCP on the AeroDAQ significantly reduces the overhead for maintaining a network of instrumentation.

Specification

Recorder

Environmental Performance

Temperature limits	Operation:	0 to +50° C
	Storage:	–20 to 60° C
Humidity limits	Operation:	5% to 80% RH
	Storage:	5% to 90% RH
Protection	Bezel and display:	IP66
	Sleeve:	IP20
Shock:		BS EN61010
Vibration (10 to 150Hz):		BSEN60873, Section 9,18
Altitude:		<2000 meters

Approvals

Electromagnetic compatibility CE, cUL (EMC)

UL file number:	e57766
Emissions and immunity:	BS EN61326

Electrical Safety

(BS EN61010):	Installation cat. II; Pollution degree 2

INSTALLATION CATEGORY II
The rate impulse voltage for equipment on nominal 230 V mains is 2500 V.

POLLUTION DEGREE 2
Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected.

Physical

Panel mounting:		DIN43700
Panel mounting angle:		±45°
Dimensions	Bezel size:	292 x 292 mm (11.5 x 11.5 in)
	Panel cutout:	281 x 281 mm (both –0/+1 mm) (11 x 11 in (both –0/+0.04 in))
	Depth behind bezel rear face:	261 mm (10.2 in)
	Weight:	7 kg max. (15.4 lb)

Operator Interface

Type:	Color TFT LCD with cold cathode backlight, fitted with resistive, analog, Touch-Panel
Size and resolution	XGA (1024 x 768 pixels) 12.1”

Power Requirements

Supply voltage	Standard:	85 to 265 V AC 47 to 63 Hz or 110 to 370 V DC
	Low voltage option*:	20 to 42 V RMS; 45 to 400 Hz or 20 to 54 V DC
Power (Max):		50 W
Fuse type:		None
Interrupt protection	Standard:	Holdup >200 msec, at 240 V AC, with full load

Back-up Battery

Type:	Poly-carbonmonofluoride/lithium (BR2330) Part No. PA261095
Support time (RTC):	1 year min. with recorder unpowered
Replacement period:	3 years
Stored data:	Time; date; values for totalizers, counters and timers; batch data; Fvalue, Rolling average, Stopwatch, etc.

Ethernet Communications

Type:		10/100baseT Ethernet (IEEE802.3)
Protocols:		TCP/IP, SFTP/FTP, DHCP, BOOTP, SNTP, MODBUS, SMTP, ICMP, EtherNet/IP server
Cable	Type:	CAT5
	Maximum length:	100 meters
	Termination:	RJ45

Serial Communications Option

No of ports:	2
Protocol:	ASCII (typical applications: Input of ASCII string inputs from Barcode readers, Credit card readers, etc.) ASCII printer support Modbus RTU Master and Slave
Isolation (dc to 65Hz BS EN61010):	Installation category II; Pollution degree 2
Terminals to ground:	50V RMS or dc (basic insulation)
Transmission standard:	EIA232 or EIA485 (software selectable)

* Please consult Eurotherm for this option

Input Board

General

Input types:	DC Volts, DC millivolts, DC milliamps (with shunt), Thermocouple, 2/3-wire RTD Contact closure (not Channels 1, 7, 13, 19, 25, 31, 37, 43) >60 ms
Input type mix:	Freely configurable
Maximum number of inputs:	6 per board
A/D conversion method:	>16 bits, 2nd order delta sigma
Input ranges:	See Table1 and Table 2 below
Termination:	Connector / terminal block
Noise rejection (48 to 62 Hz):	Common mode: >140 dB (channel to channel and channel to ground)
Series mode:	>60 dB
Max. common mode voltage:	250 V continuous
Max. series mode voltage:	45 mV at lowest range; 23.74 Volts peak at highest range
Isolation Channel to channel:	300 V RMS or DC (double insulation)
Channel to common electronics:	300 V RMS or DC (double insulation)
Channel to ground:	300 V RMS or DC (basic insulation)
Dielectric strength (BS EN61010)	(1 minute type tests)
Channel to channel:	2500 V AC
Channel to ground:	1500 V AC
Insulation resistance:	>10 MΩ at 500 V DC
Input impedance:	38 mV, 150 mV, 1 V ranges: >10 MΩ; 20 V range: 65.3 kΩ
Over voltage protection:	50 V peak (150 V with attenuator)
Open circuit detection:	± 57 nA max.
Recognition time:	500 msec
Minimum break resistance:	10 MΩ

Update/archive Rates

Input/Relay-output sample rate:	8 Hz
Trend update:	8 Hz maximum
Archive sample-value:	Latest value at archive time
Display value:	Latest value at display update time (8 Hz)

DC Input Ranges

Shunt:	Externally mounted resistor modules
Additional error due to shunt:	0.1% of input
Additional error due to attenuator:	0.2% of input
Performance:	See Table 1
Long term drift:	Meets the requirements of AMS2750E for Class 1 Furnace Requires an Input Adjust be performed to meet the requirements of AMS2750E

Table 1 Voltage Ranges — Accuracy and Resolution

Low Range	High Range	Resolution	Typical error (instrument at 20° C) Range	Maximum error (instrument at 20° C) Range	Worst case temp Performance Input per °C
-38 mV	38 mV	1.4 µV	0.013% I/P + 0.031%	0.030% I/P + 0.052%	25 ppm
-150 mV	150 mV	5.5 µV	0.013% I/P + 0.028%	0.029% I/P + 0.039%	25 ppm
-1 V	1 V	37 µV	0.013% I/P + 0.024%	0.029% I/P + 0.029%	25 ppm
-20 V	20 V	720 µV	0.075% I/P + 0.027%	0.393% I/P + 0.033%	388 ppm

Table 2 Resistance Ranges — Accuracy and Resolution

Low Range	High Range	Resolution	Typical error (instrument at 20° C) Range	Maximum error (instrument at 20° C) Range	Worst case temp Performance Input per °C
0 Ω	150 Ω	5 mΩ	0.027% I/P + 0.034%	0.037% I/P + 0.077%	30 ppm
0 Ω	600 Ω	22 mΩ	0.027% I/P + 0.035%	0.037% I/P + 0.057%	30 ppm
0 Ω	5 KΩ	148 mΩ	0.030% I/P + 0.034%	0.040% I/P + 0.041%	30 ppm

Thermocouple Data

Temperature scale:	ITS 90
Bias current:	0.05 nA
Cold junction types:	Off, internal, external, remote
CJ error:	1° C max with inst. at 25° C
CJ rejection ratio:	50:1 minimum
Upscale/downscale drive	High, low or none selectable for each thermocouple channel
Additional error:	0.01° C (typ.) if high or low selected
Types and ranges:	See Table 3

Resistance Inputs

Ranges (including lead resistance):		0 to 150 Ω, 0 to 600 Ω, 0 to 6 kΩ
Influence of lead resistance	Error:	Negligible
	Mismatch:	1 Ω/Ω
Temperature scale:		ITS90
Accuracy and resolution:		See Table 2
RTD types and ranges:		See Table 4

Table 3 Thermocouple Types and Ranges

T/C Type	Overall Range (° C)	Standard	Max Linearization Error
B	0 to +1820	IEC 584.1	0 to 400° C=1.7° C 400 to1820° C=0.03° C
C	0 to +2300	Hoskins	0.12° C
D	0 to +2495	Hoskins	0.08° C
E	–270 to +1000	IEC 584.1	0.03° C
G2	0 to +2315	Hoskins	0.07° C
J	–210 to +1200	IEC 584.1	0.02° C
K	–270 to +1372	IEC 584.1	0.04° C
L	–200 to +900	DIN43710:1985 (To IPTS68)	0.02° C
N	–270 to +1300	IEC 584.1	0.04° C
R	–50 to +1768	IEC 584.1	0.04° C
S	–50 to +1768	IEC 584.1	0.04° C
T	–270 to +400	IEC 584.1	0.02° C
U	–200 to +600	DIN43710:1985	0.08° C
NiMo/NiCo	–50 to +1410	ASTM E1751-95	0.06° C
Ni/NiMo	0 to +1406	Ipsen	0.14° C
Platinel	0 to +1370	Engelhard	0.02° C
Pt20%Rh/ Pt40%Rh	0 to +1888	ASTM E1751-95	0.07° C

Table 4 RTD Types and Ranges

RDT Type	Overall Range (° C)	Standard	Max Linearization Error
Cu10	–20 to +400	General Electric Co.	0.02° C
Cu53	–70 to ± 200	RC21-4-1966	<0.01° C
JPT100	–220 to +630	JIS C1604:1989	0.01° C
Ni100	–60 to +250	DIN43760:1987	0.01° C
Ni120	–50 to +170	DIN43760:1987	0.01° C
Pt100	–200 to +850	IEC 751	0.01° C
Pt100A	–200 to +600	Eurotherm Recorders SA	0.09° C
Pt1000	–200 to +850	IEC 751	0.01° C

Relay Output Board

General

Max. number of relay boards	9 (max. no of relay outputs = 27)
No. of relays per board:	3 per C/O
Estimated mechanical life:	30,000,000 operations
Update rate:	See “Update rates” in “Recorder Specification” above

AC Load Ratings

Derating
The figures give below are for resistive loads. for reactive or inductive loads, derate in accordance with Graph 1, in which:

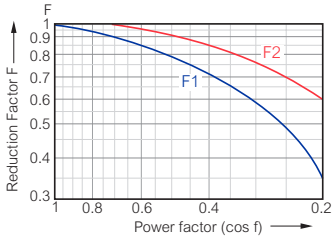
F1 =	Actually measured results on representative samples
F2 =	Typical values according to experience
Contact life =	Resistive contact life x reduction factor
Maximum switching power:	500 VA
Maximum contact voltage:	250 V providing this does not cause the maximum switching power (above) to be exceeded
Max. contact current:	2 Amps providing this does not cause the maximum switching power (above) to be exceeded

DC Load Ratings

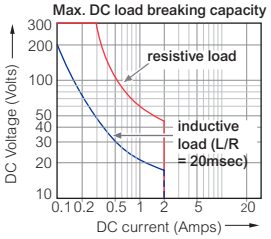
Max. switching power:	See Graph 2 for operating volt/amp envelope
Max. contact voltage/current:	See Graph 2 for examples

Safety Isolation

Isolation (dc to 65Hz; BS EN61010):		Installation category II; Pollution degree 2
	Relay to relay:	300 V RMS or DC (double insulation)
	Relay to ground:	300 V RMS or DC (basic insulation)

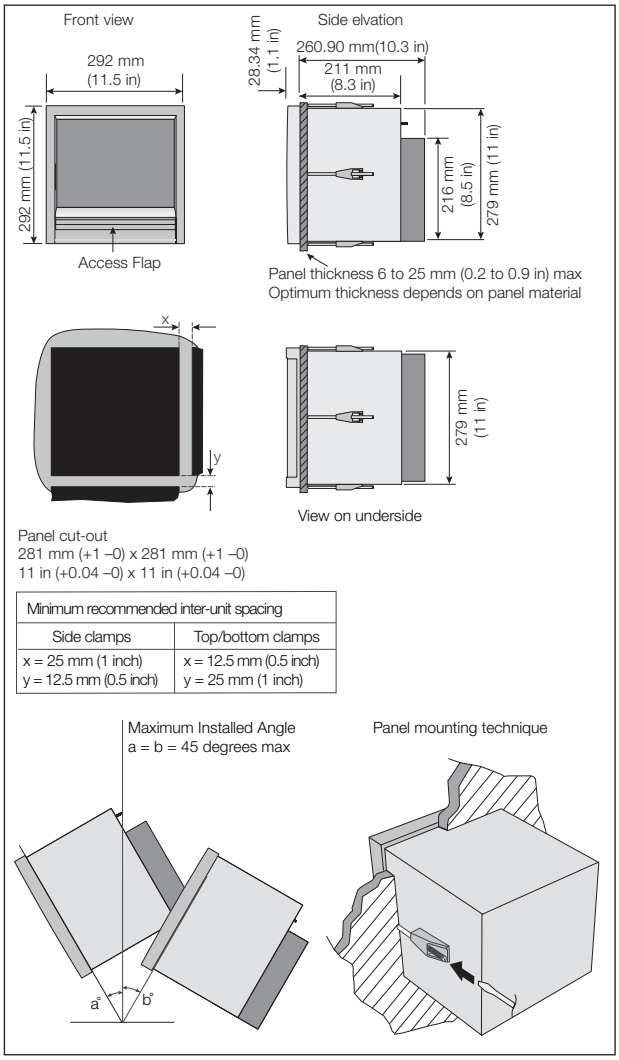


Graph 1 Derating curves for AC loads



Graph 2 DC load switching curves

Mechanical Installation

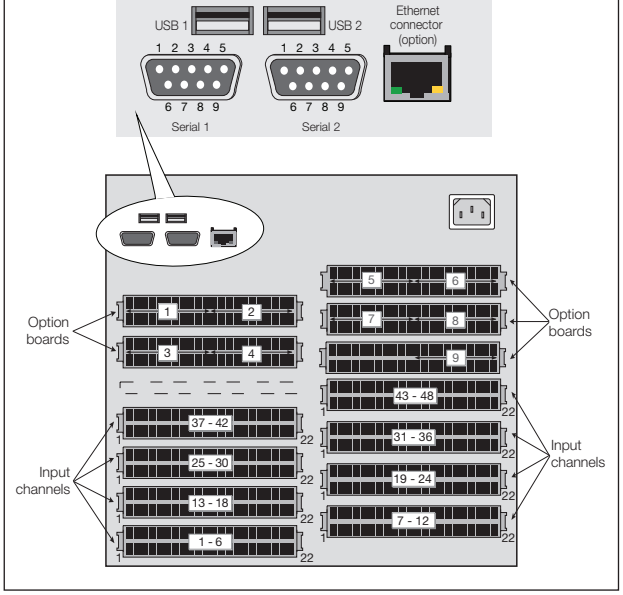


Minimum recommended inter-unit spacing	
Side clamps	Top/bottom clamps
x = 25 mm (1 inch) y = 12.5 mm (0.5 inch)	x = 12.5 mm (0.5 inch) y = 25 mm (1 inch)

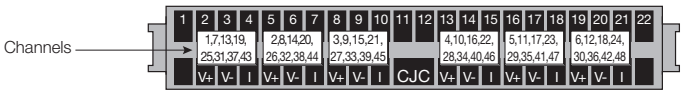
Rear Terminal Connections

Serial communication port pinout

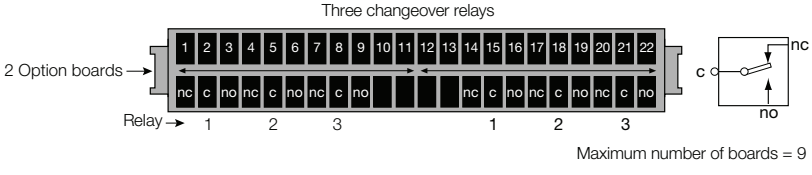
Pin	EIA232	EIA485 (5-wire)	EIA485 (3-wire)
1	Not connected	RxA	Link to pin 7
2	Rx	Not connected	Not connected
3	Tx	Not connected	Not connected
4	DTR	Not connected	Not connected
5	Signal ground		
6	Not Connected	RxB	Link to pin 8
7	Not Connected	TxA	TxA/RxB
8	Not Connected	TxB	TxB/RxA
9	5.0 V via 1500 Ω		



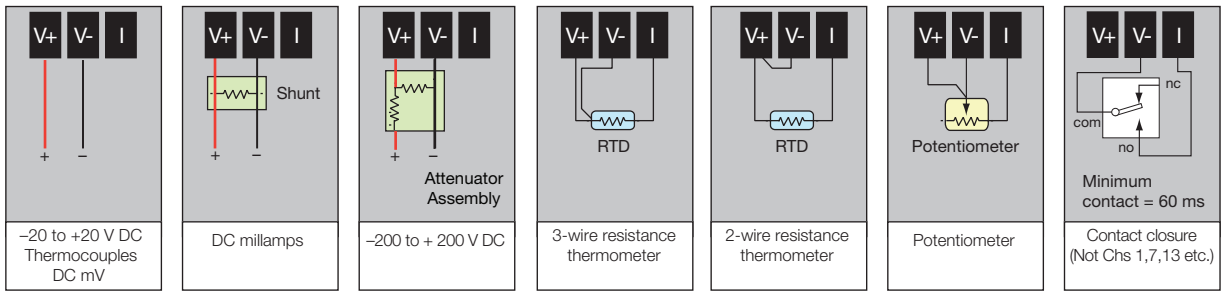
Input Board Wiring



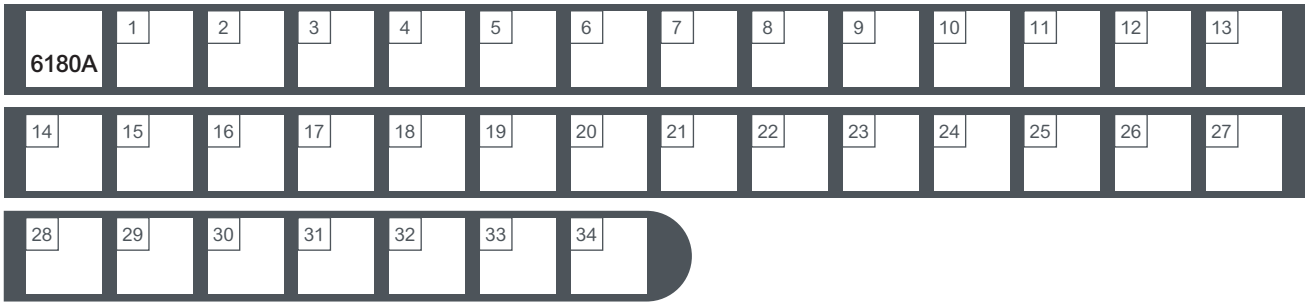
Relay Board Wiring



Input Board Signal Wiring



Order Codes



Basic Product	
6180A	180 mm TFT XGA Display

1 Number of Channels	
U00	0 Input channels
U06	6 Input channels
U12	12 Input channels
U18	18 Input channels
U24	24 Input channels
U30	30 Input channels
U36	36 Input channels
U42	42 Input channels
U48	48 Input channels

2 Industrial Variant	
AERODAQ	Industrial variant

3 Case Options	
PANEL	Panel mounting
CH	Carry handle (Bezel Color Silver)

4 Lock	
NOLCK	Media lock not fitted
LOCK	Electronic lock fitted

5 Bezel Color	
SLV	Silver including portable options
BLK	Black

6 Power Supply	
VH	90-264 V AC (110-370 V DC) 47-63 Hz

7	
XXXXX	Not fitted

8 Non Standard	
XXXXXX	Non standard option

9 Internal Memory	
096M	96 MB for history – approx. 12 million samples

10 Removable Media	
CF	Compact Flash and Front USB port
SD	Secure Digital and Front USB port

11 Memory Card	
NOMC	Not fitted
002G	2 GB Card CF only*
004G	4 GB Card CF only*
008G	8 GB Card CF only*

* Please consult Eurotherm for this option

12 USB Memory Stick Size	
NOMC	Not fitted
002GMS	2 GB*
004GMS	4 GB*
008GMS	8 GB*

13 Rear USB	
0RUSB	No rear USB ports
2RUSB	2 USB ports at rear

14 Serial Communications Ports	
0SRL	Not fitted
2SRL	2EIA 232/422/485

15 EtherNET/IP Communications Protocol	
NONE	Not fitted
ESERV	EtherNet/IP server

16 Calibration Certificates	
NOCAL	Not required
CAL	Calibration certificate

17 Changeover Relays	
00	Not fitted
03	3 (1 option brd)
06	6 (2 option brds)
09	9 (3 option brds)
12	12 (4 option brds)
15	15 (5 option brds)
18	18 (6 option brds)
21	21 (7 option brds)
24	24 (8 option brds)
27	27 (9 option brds)

18 Normally Closed Relays	
00	Not fitted

19 Normally Open Relays	
00	Not fitted

20 Event Inputs	
00	Not fitted
06	06 (1 brd)
12	12 (2 brds)
18	18 (3 brds)
24	24 (4 brds)

21 Analog Outputs	
00	None
02	2 (1 option brd)
04	4 (2 option brd)
06	6 (3 option brd)
08	8 (4 option brd)

22 Quantity of Shunts	
_ _	Enter quantity required

23 Shunt Value	
NOS	Not required
100	100 ohm shunts
250	250 ohm shunts

24 Quantity of 100:1 Attenuators	
_ _	Enter quantity required

25 Warranty	
XXXXX	Standard warranty
WL005	Extended warranty

26 Bridge	
BLITE	Lite (supplied as standard)
BFULL	Full

27 Review & Quickchart	
RLITE	Lite (supplied as standard)
RFULL	Full

28 Auditor	
NOADT	Not required
ALITE	Audit Trail
AFULL	Auditor Full

29 Security Manager	
NOSM	Not required
SECMAN	Security Manager (including Active Directory)

30 Groups	
06GROUP	6 (supplied as standard)
12GROUP	12

31 Math, Totalizers & Counters	
MTC00	Not required
MTC36	36 Virtual Channels
MTC96	96 Virtual Channels
MTC128	128 Virtual Channels

32 Batch	
NOBTCH	Not required
BATCH	Batch

33 Screen Builder	
NOSB	Not required
ADSB	Advanced Screen Builder

34 Master Communications	
NOMSTR	Not required
MSTR16	16 Slaves
MSTR32	32 Slaves

Standard AeroDAQ Ordering Code

6180A/U06/AERODAQ/NOLCK/SLV/VH/XXXXX/XXXXX/032M/CF/NOMC/NOMS/0RUSB/0SRL/NONE/NOCAL/00/00/00/00/00/NOS/00/XXXXX/BLITE/RLITE/ALITE/NGSM/06GROUP/MTC36/BATCH/ADSB/NOMSTR

0	Model 6180A 180mm TFT XGA Display	.6180A
1	Number of channels 6 Input Channels	.U06
2	Industry variant	.AERODAQ
3	Case Options Panel mounting	.PANEL
4	Lock Media lock not fitted	.NOLCK
5	Bezel colour Silver including portable options	.SLV
6	Power supply 90- 264 Vac (110-370V dc) 47 –63 Hz	.VH
7	Not used	.XXXXX
8	Non standard Non Standard Option	.XXXXXX
9	Internal memory 96M Byte for history – approx 12 million samples	.096M
10	Removable media Compact Flash and Front USB port	.CF
11	Memory card size Not fitted	.NOMC
12	USB Memory device size Not fitted	.NOMS
13	Rear USB No rear USB ports	.0RUSB
14	Serial communication ports Not fitted	.0SRL
15	EtherNet Communications Protocol	.NONE
16	Calibration certificates Not required	.NOCAL
17	Changeover relays Not fitted	.00
18	Normally closed relays Not fitted	.00
19	Normally open relays Not fitted	.00
20	Event inputs Not fitted	.00
21	Analogue outputs None	.00
22	Quantity of shunts Enter quantity required	._ _
23	Shunt value Not required	.NOS
24	Quantity of attenuators (100:1) Enter quantity required	._ _
25	Warranty Standard warranty	.XXXXX
26	Bridge Bridge Lite (Supplied as standard)	.BLITE
27	Review and quickchart Lite (supplied as standard)	.RLITE
28	Auditor Audit Trail	.ALITE
29	Security manager Not required (including Active Directory)	.NOSM
30	Groups 6 Groups (supplied as standard)	.06GROUP
31	Maths, totalisers and counters 36 Virtual Channels	.MTC36
32	Batch Batch	.BATCH
33	Screen builder Advanced screen builder	.ADSB
34	Master communications Not fitted	.NOMSTR

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