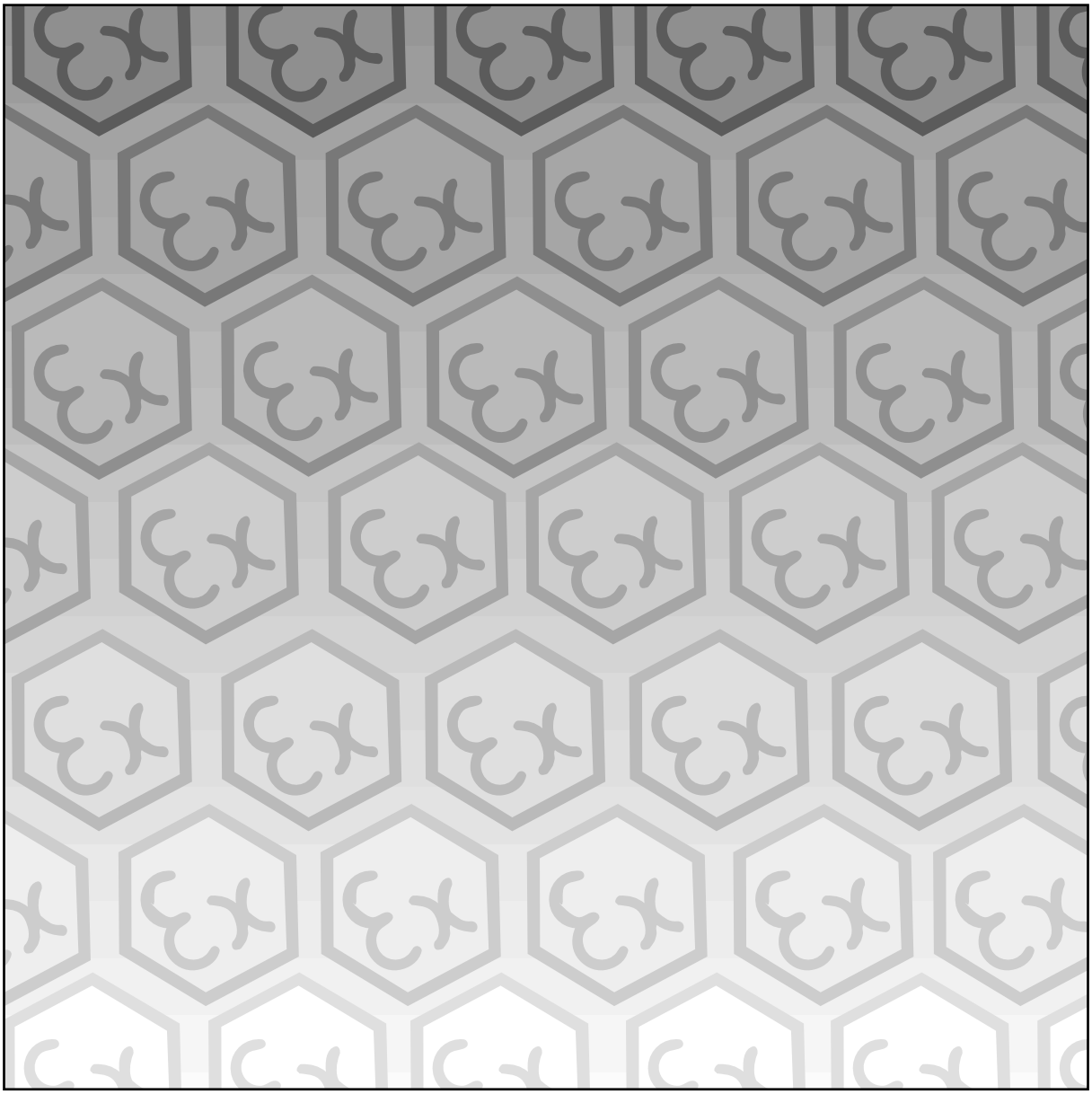
F600A Redundant fieldbus power system



Instruction Manual

INM F600A-1

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Fig.1 F600A assembly

1 OVERVIEW

The MTL-Relcom redundant fieldbus power system (FPS-Series) provides redundant power conditioning for fieldbus network segments and facilitates the connection of redundant input power supplies. The system is fully 'hot-swappable' meaning that individual power conditioning modules and input power supplies can be replaced without interrupting power or communication on the fieldbus segment. An alarm circuit provides warning in case of a power conditioning module or input power supply failure. The system is designed so that power for several fieldbus segments can be provided from a single cabinet with minimal wiring.

2 DESCRIPTION

This document specifies a FOUNDATION Fieldbus H1 four Segment Backplane with Alarm monitoring designed to accommodate four redundant pairs of Relcom IPM power supply and conditioner modules. The backplane is available as either a left hand or right hand version, one being a mirror image of the other. It is intended to be located in the safe area. Host trunk connections for all four segments will be by a redundant pair of 20 way IDC connectors designed to be compatible with a Yokogawa ALF111 card interface. The Field trunk on each segment, which is directly connected to its respective Host, will use a 3-way screw terminal or spring clamp connector. Power for all segments is common and derived from two diode ORed sets of connections allowing redundant bulk power supplies to be used. The power inputs are galvanically isolated from the Fieldbus circuitry via the IPM modules. Alarm circuitry is housed in a separate module which plugs onto the backplane. This circuitry is referenced to the power inputs and indicates an alarm condition via relay contacts.

3 COMPONENTS AND ACCESSORIES

Redundant fieldbus power supply systems include the following parts: (see component part numbers below)

	Screw terminal		Pluggable spring clamp	
	Left hand	Right hand	Left hand	Right hand
	F600A-L	**F600A-R**	**F600A-LC**	**F600A-RC**
FPS-IPM	8	8	8	8
FPS-ALM	1	1	1	1
F600A-CL-ST	1			
F600A-CR-ST		1		
F600A-CL-PC			1	
F600A-CR-PC				1

COMPONENTS AND ACCESSORIES

PART No	DESCRIPTION
FPS-IPM	Power Module
FPS-ALM	Alarm Module
F600A-CL-ST	F600A carrier, Left Hand, Screw Terminals
F600A-CR-ST	F600A carrier, Right Hand, Screw Terminals
F600A-CL-PC	F600A carrier, Left Hand, Pluggable spring clamp
F600A-CR-PC	F600A carrier, Right Hand, Pluggable spring clamp
DMK01	DIN-rail mounting kit, T or G section (pack of 40)†
SMS01	Surface mounting kit, (pack of 40)†
BMK08	Mounting kit for one F600A
DMK04	DIN rail mounting kit for one F600A
FPS-BLK10	Blanking Module (pack of 10)

† Sufficient to mount 10 x F600A systems

4 MECHANICAL

Important dimensions for the F600A-L, F600A-LC, F600A-R and F600A-RC assemblies are shown in figures 2 and 3 below.

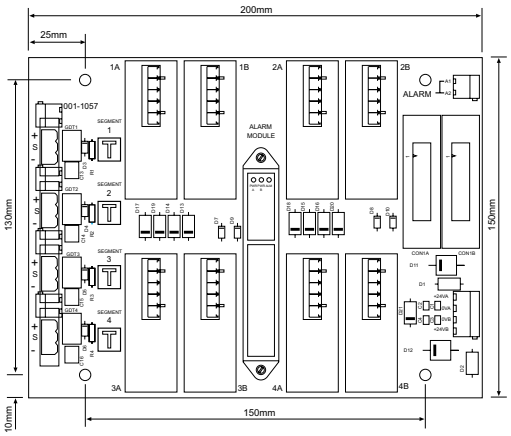

Fig.2 F600A-L

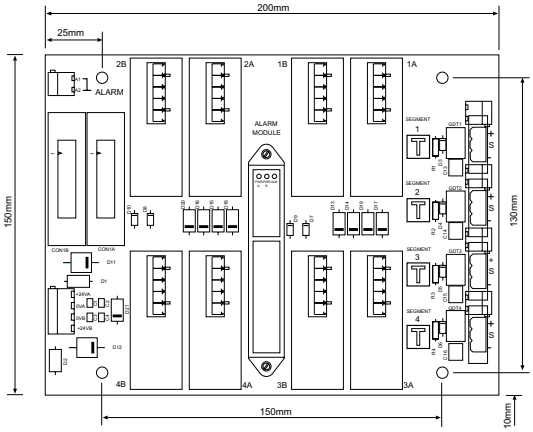

Fig.3 F600A-R

4.1 Mounting

It is recommended that the F600A assembly is mounted on a vertical surface with the orientation of the IPM modules as shown in figures 2 and 3 above. Four 5mm diameter mounting holes are provided for surface mounting or dual DIN rail mounting. MTL SMS01 surface, or DMK01 DIN rail, kits may be used for this purpose. When DIN rail mounting, 2 vertical DIN rails spaced 150mm apart are required.

5 INSTALLATION

5.1 Mounting & enclosure requirements

5.1.1 General

These power supplies may be mounted only in safe areas and wherever they are located, the mounting conditions must:

(a) prevent any form of pollution that could compromise the operation of the unit. For example, an unpolluted location or a suitable enclosure could be chosen.

(b) provide an adequate level of mechanical protection. This can be achieved by selecting a protected location, a suitable enclosure, or a combination of both.

(c) ensure that all cable entries and connections are secure by making provision for the careful routing and securing of all cables.

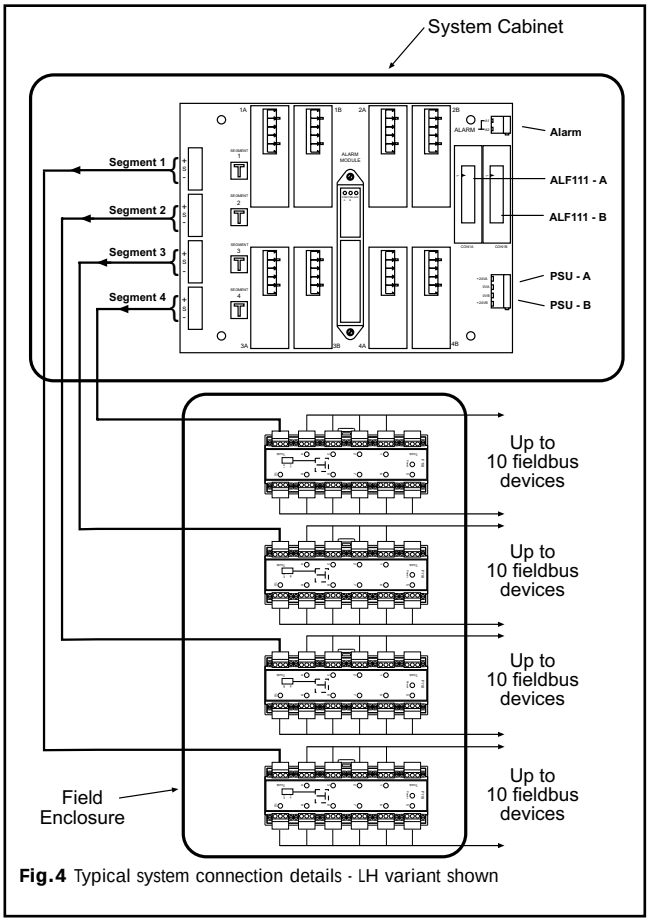

Fig.4 Typical system connection details - LH variant shown

(d) provide adequate security against unauthorised interference.

(e) ensure that the permitted ambient temperature range of the units (–40°C to + 65°C) is not exceeded. Power dissipation within the enclosure and the use of shading against direct sunlight should be considered.

5.1.2 Outdoor mounting

Where power supplies are to be mounted in outdoor locations, a suitable enclosure with a minimum of IP54 ingress protection is required. However, in some locations, a higher degree of ingress protection rating is recommended since corrosion resistance may be necessary or desirable and the emphasis should be placed on the suitability for the application.

5.2 Surface mounting - with kit SMS01

Refer to figures 2, 3, 4.1and 4.2.

a) Select four M4 x 20mm screws.

b) Prepare holes in the mounting surface at centres as shown in figures 2 and 3, tapping these if retaining nuts are not required.

c) Place a locking washer (2) and a plain washer (3) over each M4 x 20mm screw (1) (figure 4.1).

d) Insert the screws through the carrier at each mounting centre (figures 2 and 3).

e) Fit M4 x 10mm spacers (5), retaining them with retaining washers (6) (figure 4.1).

f) Attach the carriers into the pre-drilled surface holes, retaining the screws with a suitable nut if the holes are not tapped.

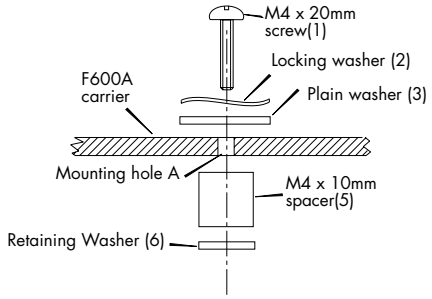

Figure 4.1: Surface mounting procedure

5.3 T- or G-section DIN-rail mounting – with kit DMK01 or DMK04

Refer to figures 2, 3, 4.2, 4.3 and 4.4.

a) Select two pieces of T- or G-section DIN-rail of the appropriate lengths for the number of F600A carriers to be mounted.

b) Mount the two lengths of DIN-rail side-by-side at 150mm centres (figures 2, 3 and 4.2).

c) Clip the four mounting feet (7) to the DIN rail (8) at the centres shown in figures 2 and 3.

d) Select four No.6 x ½-inch screws.

e) Place a locking washer (2) and a plain washer (3) onto each No.6 x ½-inch screw (1) (figure 4.3).

f) Insert the assemblies through the mounting holes on the carrier (figures 2, 3 and 4.3).

g) Fit spacers (5), retaining them with the washers (6) (figure 4.3).

h) Locate the assemblies over the mounting feet and attach the screws (1) to the feet (figure 4.3).

i) For vertically orientated backplanes attach one end stop (11) to the lower end of each DIN-rail supporting a column of carriers by clipping the stops into place and tightening the appropriate screw [(12) for T-section and (13) for G-section DIN-rails] (figure 4.4).

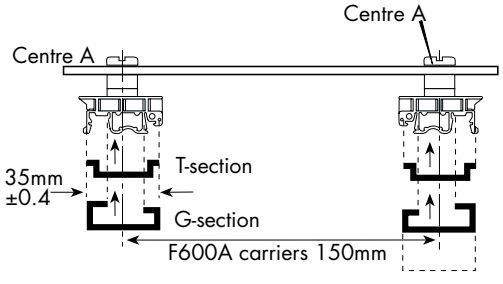

Figure 4.2: T-section and G-section DIN-rail attachment

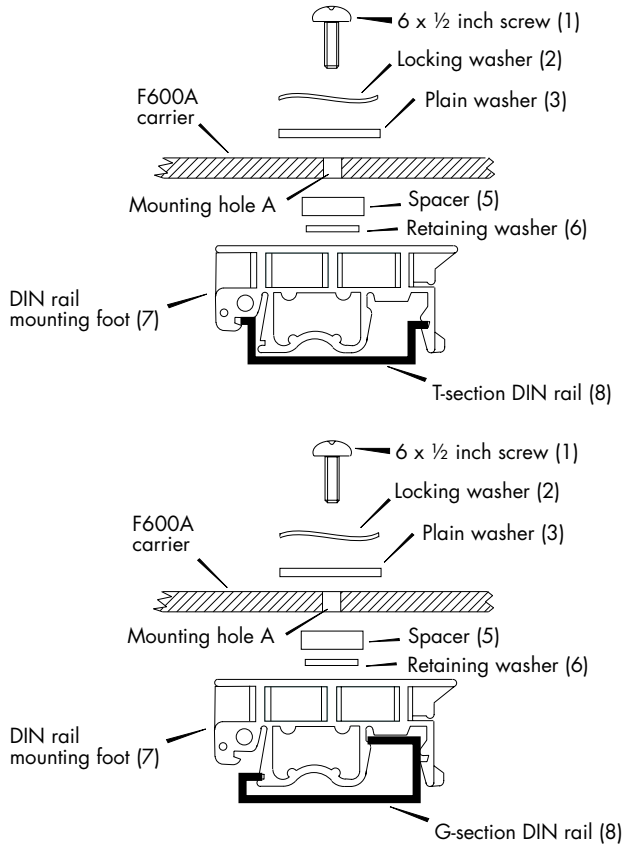

Figure 4.3: Surface mounting procedure

j) Additional end stops should be attached between carriers to increase the stability of tall columns of carriers.

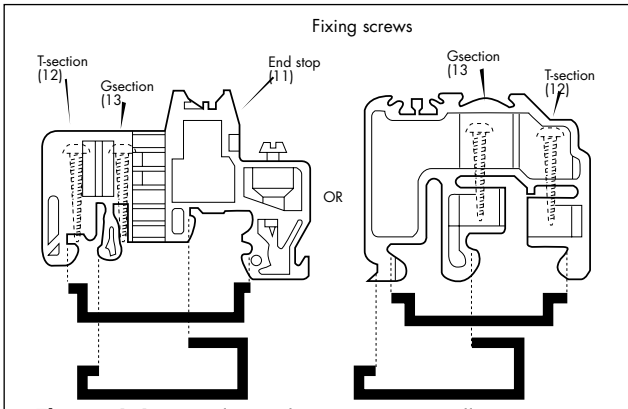

Figure 4.4: Mounting end stops onto DIN-rail

5.4 Power Requirements

Dual redundant power terminals requiring a nominal input voltage of 24V dc are provided allowing the use of bulk power supplies with a supply range of 18-30V dc. The cable length to the bulk supply shall be limited to a maximum of 30 metres.

5.5 Connections

Various connections are provided on the F600A. Refer to figure 4 for detail and position.

System

Redundant connectors CON1A and CON1B via AKB336 cables to ALF111 cards. The cable length should not exceed 30 metres.

Alarm

Alarm contacts via A1 & A2 (Fieldbus & Power common alarm).

Fieldbus

4 fieldbus segments via

Fixed rising cage clamp screw terminals (-ST)
Conductor size: 0.14 to 2.5mm^2
Pluggable spring clamp terminals (-PC)
Conductor size: 0.2 to 2.5mm^2 flexible or rigid

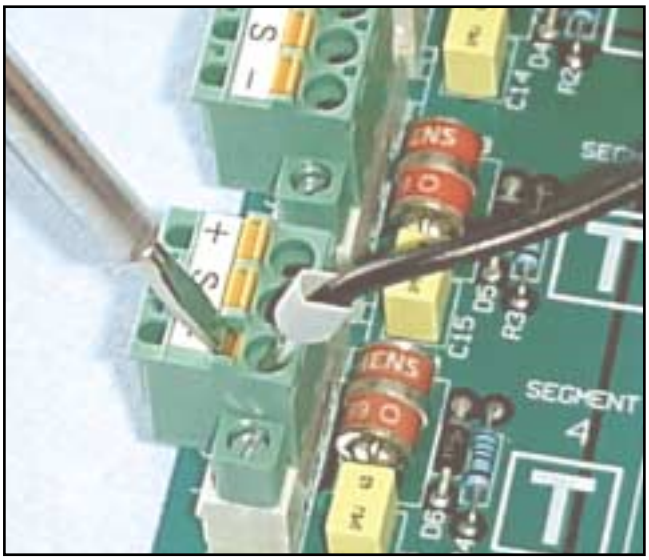

Fig.5 Spring clamp terminal connectors

NOTE: When wiring to spring-clamp terminals, use a screwdriver with a 3-4 mm blade and depress the spring-clamp button before inserting the termination cable. See Figure 5.

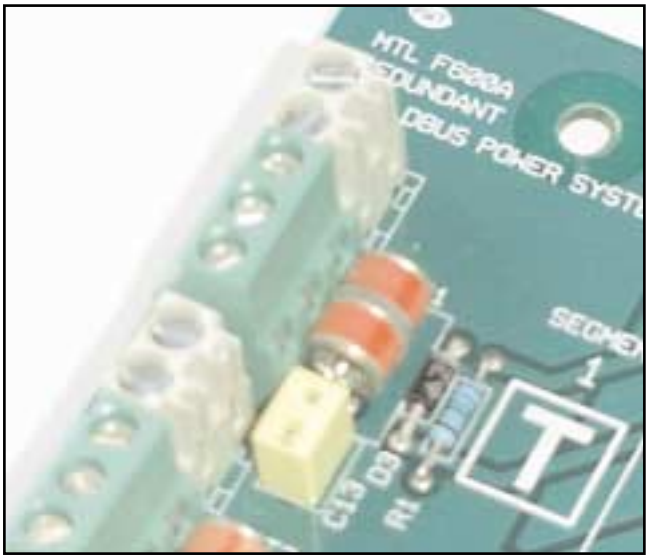

Fig.6 Terminal test points built in to the screw clamp terminals

Screen

To connect all cable screen to a common point.
(Cabinet earth)

Terminators

One per channel included.

5.6 Input

Input voltage
18 - 30V DC
Current consumption (4 segments each with 350mA output load)
3.4A (typical)at 18V
2.4A (typical) at 24V
2.1A (typical) at 28V

Power dissipation (4 segments each with 350mA output load)
20.3W (typical)

5.7 Alarms

Alarm contact rating: 1A max @ 30V DC max
Alarm contact status: Normally closed
Alarm threshold: Input <18V DC
Output <22V DC

5.8 Output

Number of channels
Four
Voltage
Minimum 25.0V DC.
Current
0 to 350mA.
Output ripple
Complies with clause 22.6.2 of the fieldbus standard.
Minimum load
No load.
Isolation
Fieldbus to power supply: 250V AC rms withstand.
Segment to segment: 50V AC isolation and 1500V DC withstand.

5.9 Environmetal

Location of equipment
Safe area
Ambient temp
Operating, optimum orientation*
–40°C to +65°C
Storage
–40°C to +85°C
Ingress Protection
IP20 to BS EN 6529 (Additional protection by means of enclosure)

**Optimum orientation is when the carrier is mounted on a vertical surface as shown in figures 2 and 3.*

5.10 Testing

Remove each power module (and replace in turn) and check that the alarm led illuminates and that the alarm chain is broken. Disconnecting each power input in turn should also cause the alarm condition, and extinguish the associated alarm green power LED. Check all power module green LEDs are lit. Test points for checking the output terminal voltages and waveforms are situated adjacent to each screw clamp terminal and are colour coded white. See Figure 6. For spring-clamp terminals, the test points are built-in in parallel with the terminal assembly

6 ROUTINE MAINTENANCE

Check the general condition of the installation occasionally to make sure that no deterioration has occurred. At least every two years (and more frequently for particularly harsh environments) check:

- *the condition of wire connection/terminations/screens.*
- *the DC output voltage on each of the four fieldbus segments is >25V. This can be performed using a multimeter or a Relcom FBT-3 fieldbus tester.*
- *that the Power A and Power B LEDs on the FPS-ALM module are functioning.*
- *that the LEDs on all 8 FPS-IPM modules are on.*
- *that all of the retaining screws are tight.*
- *that there are no signs of damage or corrosion.*

MTL Instruments Pty Limited
1/30 Canvale Road
Canning Vale
Perth, WA 6155
Australia
Tel: +61 (0)8 9455 2994 Fax: +61 (0)8 9455 2805
E-mail: enquiries@mtlaus.com.au

MTL Canada Safety Instrumentation
#102, 4249 97 Street
Edmonton, Alberta
Canada T6E 5Y7
Tel: +1 780 485 3132 Fax: +1 780 485 3122
E-mail: cinfo@mtlnh.com

MTL Instruments Pte
Room 1002A, The Gateway
No 10 Yabao Road, Chaoyang District
Beijing 100020
China
Tel: +86 010 8562 5718/5720/5721 Fax: +86 010 8562 5725
E-mail: bjsales@mtl-inst.cn

MTL Instruments sarl
Les Carrés du Parc
10 rue des Rosiéristes
69410 Champagne au Mont d'Or
France
Tel: +33 (0)4 78 64 98 32 Fax: +33 (0)4 78 35 79 41
E-mail: info@mtl-inst.fr

MTL Instruments GmbH
An der Gümpgesbrücke 17
D-41564 Kaarst
Germany
Tel: +49 (0)2131 718930 Fax: +49 (0)2131 7189333
E-mail: info@mtl.de

MTL India Pvt. Limited
No. 36, Nehru Street
Off Old Mahabalipuram Road
Sholinganallur
Chennai - 600 119
India
Tel: + 91 (0)44 24501660/24501857 Fax: + 91 (0)44 24501463
E-mail: sales@mtlindia.com

MTL Italia srl
Via Cantù 11
I - 20092 Cinisello Balsamo MI
Italy
Tel: +39 (0)2 61802011 Fax: +39 (0)2 61294560
E-mail: info@mtl-inst.it

MTL Instruments KK
3rd Floor, Gotanda Masujima Building
1-8-13 Higashi-Gotanda, Shinagawa-Ku
Tokyo 141-0022
Japan
Tel: +81 (0)3 5420 1281 Fax: +81 (0)3 5420 2405
E-mail: sales@mtlkk.co.jp

MTL Instruments BV
PO Box 55, 6680 AB Bemmel
de Houtakker 36, 6681 CW Bemmel
The Netherlands
Tel: +31 (0)481 450250 Fax: +31 (0)481 450260
E-mail: info@mtlbenelux.com

MTL Instruments Pte Limited
31 Ubi Road 1
#04-01 Aztech Building
Singapore 408694
Tel: +65 6 487 7887 Fax: +65 6 487 7997
E-mail: sales@mtlsing.com.sg

MTL Instruments
Villa No. 4, Sector 2-17,
Street 6
PO Box 53234,
Abu Dhabi, UAE
Tel: +971 2 446 6840 Fax: +971 2 446 6841
E-mail: mtlgulf@mtl-inst.com

Measurement Technology Limited
Power Court, Luton, Bedfordshire
England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283
E-mail: enquiry@mtl-inst.com

MTL Incorporated
4001 W. Sam Houston Parkway N. Suite 150, Houston TX 77043
USA
Tel: +1 281 571 8065 Fax: +1 281 571 8069
E-mail: info@mtl-inst.com

Group Internet home page http://www.mtl-inst.com/

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