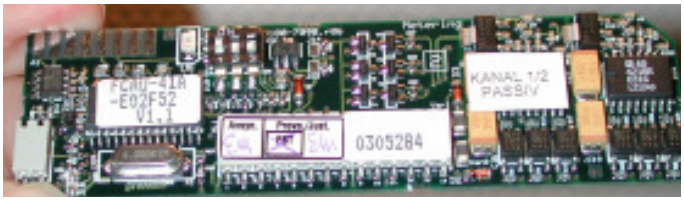

Data sheet / Manual

Analogue output board (FCAU)

The analogue output board provides the F4 calculator with up to two passive analogue outputs (4-20mA) with varistor protection and galvanic separation.

Analogue outputs

Normally the two analogue outputs are passive, e.g. they must be supplied from an external 24 V power supply, see fig.1 below.

For each analogue output one momentary value can be selected. The selectable momentary values are:

- Flow
- Power
- Forward Temperature (high)
- Return Temperature (low)
- Temperature Difference
- External Variable

Note: No negative values are delivered.

Note: The analogue output board must only be mounted in a mains supplied F4.

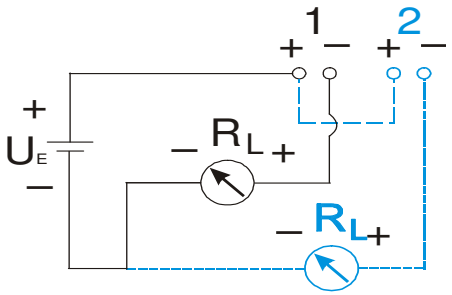

Fig.1. Connection diagram.

Data collection

The analogue output board collects data from the Calculator as follows:

Power, Flow and External variables

For these values the board uses a "watchdog timeout" which can be set in steps of 0.6 seconds. See *Device specific help* in the *Plug & Play program* for more information.

Temperature values

This value is updated each time the calculator performs a measurement, see also F4 manual.

Note: When installed, the board will not output any signals until the first "watchdog timeout" has passed.

Card slots

Allowed card slots for the analogue output board are A, B and E.

Output data

Display

The following values are displayed at the Calculator display:

1. A1 - DAC 1 Mode
2. L1 - DAC 1 Lower limit
3. U1 - DAC 1 Upper limit
4. A1 - DAC 1 Proc XXX (0-100%)
5. A2 - DAC 2 Mode
6. L2 - DAC 2 Lower limit
7. U2 - DAC 2 Upper limit
8. A2 - DAC 2 Proc XXX (0-100%)

M-Bus

There is no data from the analogue output board available at the M-Bus.

Analog output

4–20mA, where the *lower limit* corresponds to 4mA and the *upper limit* corresponds to 20mA.

For the external variable "0000" is output as 4mA and "FFFF" as 20mA.

Testing

The analogue output board has a built-in current level test. Set the dipswitches according to table 2 below.

Important! Never change the dipswitches when the option board is powered.

Configuration

The board can be parameterized prior to installation in the F4 with the F4-adapterkit (FT-4-adapt-kk).

Note: The lowest setting of the "watchdog timeout" is 35 (approx. 20s). If a lower value is required, an analog output board with voltage regulator must be used.

Connection

D/A converter	Channel	+	-
Slot A	1	A1	A2
	2	A3	A4
Slot B	1	B3	B4
	2	B1	B2
Slot E	1	E3	E4
	2	E1	E2

Table 1, Terminal connection depending on used card slot.

Dipswitches

To ensure that the F4 Calculator will communicate properly with the option board the dipswitches must be correctly set, see table 2 below.

Card slot (Current level)	BY 1	BY 2	BY 3	Mode
A	On			Normal operation
B		On		Normal operation
E	On		On	Normal operation
0 % (4mA)				Test
25 % (8mA)	On	On		Test
50 % (12mA)			On	Test
75 % (16mA)		On	On	Test
100% (20mA)	On	On	On	Test

Table 2, Dipswitch settings depending on used card slot.

Important! Never change the settings of the dipswitches when the option board is powered.

Installation

It is very important that the power supply is disconnected when installing an option board, otherwise the calculator and/or option board may be damaged.

The following procedure is recommended when installing an option board:

1. Short circuit the connection *Save data* to force the Calculator to save data in E^2PROM.
2. Disconnect the flow sensor by removing one of the flow sensor cables connected to the calculator terminals.
3. Turn of the power by removing the 4-wire connectors *K2* and *K3*.
4. Check that the dipswitches are correctly set for chosen card slot A, and mount the option board into the slot. The component side shall be turned towards the terminals, e.g. align the option board (faced side) with the right side of the box. Ensure that all pins are correct connected to the option board contact.
5. Turn the power back on by reconnecting the 4-wire connectors *K3* (back-up battery) and *K2* (RawV). **Note:** Mains power must be connected to calculator.
6. When additional boards are to be installed, repeat the steps 3-6 (above) for each board.
7. Connect the flow sensor.

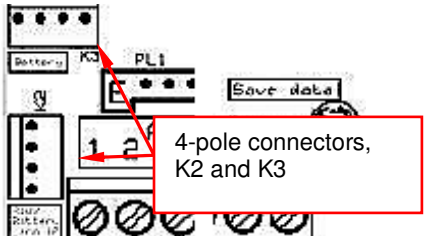

Fig.2. F4 connection terminals.

Ordering

Product designation: **FCAU**
Delivery options: **ABC**
Parameter file: **XXXXXX**

Position		Description
A	4	2 passive analogue outputs
A	X	1 passive analogue output
A	A	1 active + 1 passive analogue output **Note:** requires high output power supply in the Calculator.
B	1	Board delivered separately
B	4	Board mounted inside F4 calculator.
C	A	Card slot A
C	B	Card slot B
C	E	Card slot E

Table 3, Ordering key.

Parameter file

This file contains the parameters for a specific option board and is delivered by Metrima. See table at next page.

StandA – Standard parameter file for the calculator F4.

Example: FCAU-44A-StandA

Analog output board, 2 passive outputs, mounted in the calculator at card slot A, standard parameter file.

Ordering key

Table 3 can be used to get correct ordering key. Fill out the blank fields.

FCAU-	A	B	C	-	Parameter file*
	4			-	

Table 4, Ordering key.

*If uncertain, always choose Stand A for F4.

High output power supply

5100-3076-01 High output power supply for F4.

Parameter files

“Watchdog time out” = 35, Filter ON, 10%,
Lower limit=0.

Pos A	Ch 1	B-C range	Step	Pos B - C	Pos D	Ch 2	E-F range	Step	Pos E - F
E	Power	100 - 9900 KW	100 KW	01 - 99	E	Power	100 - 9900 KW	100 KW	01 - 99
E		10 - 19 MW	1 MW	A0 - A9	E		10 - 19 MW	1 MW	A0 - A9
E		20 - 65 MW	5 MW	B0 - B9	E		20 - 65 MW	5 MW	B0 - B9
F	Flow	100 - 9900 l/h	100 l/h	01 - 99	F	Flow	100 - 9900 l/h	100 l/h	01 - 99
F		10 - 19 m3/h	1 m3/h	A0 - A9	F		10 - 19 m3/h	1 m3/h	A0 - A9
F		20 - 65 m3/h	5 m3/h	B0 - B9	F		20 - 65 m3/h	5 m3/h	B0 - B9
F		70 - 160 m3/h	10 m3/h	C0 - C9	F		70 - 160 m3/h	10 m3/h	C0 - C9
F		180 - 360 m3/h	20 m3/h	D0 - D9	F		180 - 360 m3/h	20 m3/h	D0 - D9
F		400 - 760 m3/h	40 m3/h	E0 - E9	F		400 - 760 m3/h	40 m3/h	E0 - E9
H	High T	1 - 99 gr C	1 gr C	01 - 99	H	High T	1 - 99 gr C	1 gr C	01 - 99
H		100 - 190 gr C	10 gr C	A0 - A9	H		100 - 190 gr C	10 gr C	A0 - A9
L	Low T	1 - 99 gr C	1 gr C	01 - 99	L	Low T	1 - 99 gr C	1 gr C	01 - 99
L		100 - 190 gr C	10 gr C	A0 - A9	L		100 - 190 gr C	10 gr C	A0 - A9
D	Delta T	1 - 99 K	1 K	01 - 99	D	Delta T	1 - 99 K	1 K	01 - 99
D		100 - 190 K	10 K	A0 - A9	D		100 - 190 K	10 K	A0 - A9
S	S=special + 5 letters				P	Passive	none	none	00

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