

Type FAA-25 Analogue Amplifier

TECHNICAL MANUAL



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PRECAUTIONS

- DONT LET UNAUTHORIZED PEOPLE INTERFERE WITH THE INSTRUMENT.
- CHECK THE SUPPLY VOLTAGE, THE LOAD CELL AND ESPECIALLY THE GROUND CONNECTIONS BEFORE ENERGISING FAA-25.
- DON'T ENERGISE FAA-25 BEFORE MAKING THE LOAD CELL CONNECTION.
- DON'T CONNECT / DISCONNECT THE CABLES AND/OR CONNECTORS WHILE FAA-25 IS ENERGISED.
- DO NOT OPEN THE ENCLOSURE WHILE FAA-25 IS CONNECTED TO THE POWER SUPPLY.

WARNING !

The Error LED can be active before calibration. Do not care the error status before performing the calibration of your weighing system.

1. Features

The amplifier type FAA-25 is an accurate and economic load cell transmitter, easy to integrate into process control systems. By its “digital heart” – modern microcontroller technology – type FAA-25 allows a comfortable calibration and setup with a combination of LED’s and push buttons.

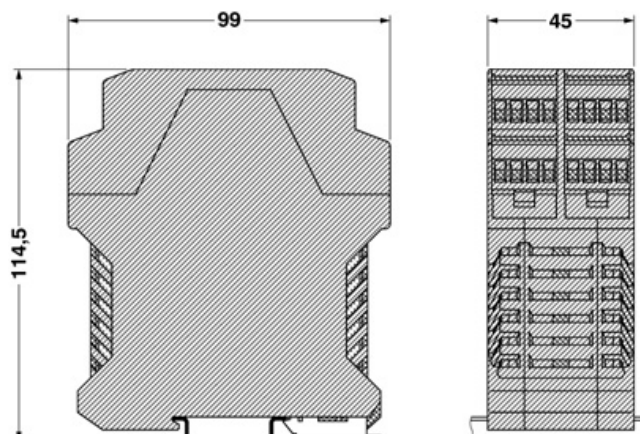
The analogue signal output is programmable to 0 – 10 V and 4 – 20 mA.

An opto-isolated interface option offers two setpoints, one error output, one input for zeroing by external command and one RS232C serial interface for setup and electronic calibration (PC software “xFace”).

1.1. Technical Specification

INPUT & A/D CONVERTER	
Linearity	0.01 % or better
Analogue input range	0 mV to 20 mV
Min. input range	< 1 mV
A/D converter	24 bit Delta-Sigma ratiometric with integral analog and digital filters
Resolution	Min. 0.1 μ V/d
Internal resolution	Min. 8 million counts
Conversion rate	Up to 100 measurement values per second
SCALE CALIBRATION & ANALOGUE OUTPUT	
Calibration	Performed with keys. There is no switch or resistor for adjustment in the instrument; alternatively by PC-software (option board required)
Digital filter	2 step adjustable digital adaptive filter
Weighing functions	Zeroing via opto-isolated digital input (option board required); max. zeroing range is 30% of weighing range
D/A converter	16 bit
Analogue output	Current output 4-20 mA (at max. 500 Ω load) or voltage output 0-10 V (at min. 10 k Ω load)
Set points	2 programmable free setpoints (option board required)
LOAD CELLS	
Excitation	5 V DC
Number of load cells	Up to 4 units of 350 Ω or 12 units of 1100 Ω (min. 85 Ω)
Connection	4 or 6 wire technique. Cable length 274 m/mm ² for 6 wire connection
SETUP & COMMUNICATION	
Front panel	Membrane keypad including 2x LED and 3x programming keys
eCal	Electronic calibration without test weights using PC software (option board required)
POWER	
Power supply	24 V DC (18...30 V DC), 200 mA
ENVIRONMENT AND ENCLOSURE	
Operation temperature	Between -10 °C and +40 °C at 85% RH max, non-condensing
Enclosure	Polyamide, for DIN-rail mount, IP20
OPTION	
Interface option	2 opto-isolated outputs for 2 setpoints, 1 opto-isolated error output, 1 opto-isolated input for zeroing and 1 RS232C serial interface
Characteristics of digital outputs	NPN open collector; 18...30 V DC, max. 50 mA

1.2. Housing Dimensions



2. Installation and Commissioning

PRECAUTION: Please read this manual carefully before energizing the amplifier and perform the commissioning operation according the procedure given here. Use trained personnel for commissioning, checking and service of the instrument. The interference of untrained personnel may cause unwanted damages or injures.

2.1. Mechanical Installation

First of all please determine the place where your instrument can operate safely. The place where you will use/install your instrument should be clean, not getting direct sunlight if possible, with a temperature between -10°C and +40°C, 85% maximum relative humidity non-condensing.

The cables should be installed safely to avoid mechanical damages.

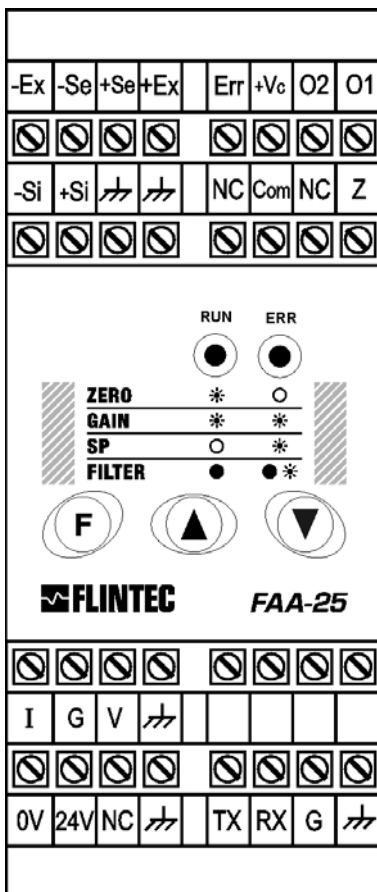
Take care to the housing dimensions given in chapter 1.2. To avoid electrical noise protect your transmitter which has very low input signal level, from the equipment that produces electrical noise.

Place your transmitter in a separate panel from the frequency converters and motor contactors, or at least place it in another partition of the panel. Do not combine signal cables and power cables in cable trays. And check that the cables are wired properly in order to prevent mechanical damage.

2.2. Electrical Connections

The pin layout of FAA-25 is shown below. Electrical connections should be done carefully. FAA-25 requires a power supply of 230 V AC (50 Hz, 6 VA, see figure 1) or 24 V DC (200 mA, see figure 2) to operate.

The meanings of the pins are:



Pin	Definition
LOAD CELL CONNECTION	
- Ex	- Excitation
- Se	- Sense
+ Se	+ Sense
+ Ex	+ Excitation
- Si	- Signal
+ Si	+ Signal
⚡	Shield
DIGITAL I/O OPTION	
Err	Error output
+ Vc	Common +24V DC for outputs
O1	Digital output no. 1
O2	Digital output no. 2
NC	Not Connected
Com	Zeroing input (0 V)
Z	Zeroing input (+24 V)
TX	Transmit (RS232C)
RX	Receive (RS232C)
G	Ground (RS232C)
ANALOGUE OUTPUT	
I	0 - 20mA output (+ Signal)
G	GND (- Signal)
V	0 - 10V output (+Signal)
⚡	Shield
NETZANSCHLUSS	
0V	0 V
24V	24 V DC
NC	Not Connected
⚡	Shield

Figure 1: FAA-25, front view and pin layout

Do not forget to connect the shield of the load cell cable and the analogue output cable to FAA-25 at the correct ground terminals.


The quality of the grounding of your system provides the accuracy of your weighing system beside it's safety. If the condition of the power line in the plant is bad, prepare a special power line and grounding.

If you have to service the instrument, turn off the power and wait at least for 30 seconds before interfering.

Perform the other connections to FAA-25 as described below.


2.3. Load Cell Connection

The load cell wiring should be made carefully before energizing to avoid damages to the instrument and the load cells. The input resistance of the load cells that you want to connect should be more than 85 Ω . The sense pins of the instrument must absolutely be connected. In 4-wire installations the sense and the excitation pins with the same polarity should be short circuited at the connector side.

Pin	6-wire Load Cell Connection	4-wire Load Cell Connection
+ Ex	+ Excitation	+ Excitation
+ Se	+ Sense	+ Excitation
- Se	- Sense	- Excitation
- Ex	- Excitation	- Excitation
+ Si	+ Signal	+ Signal
- Si	- Signal	- Signal
	Shield	Shield

2.4. Analogue Output Connection

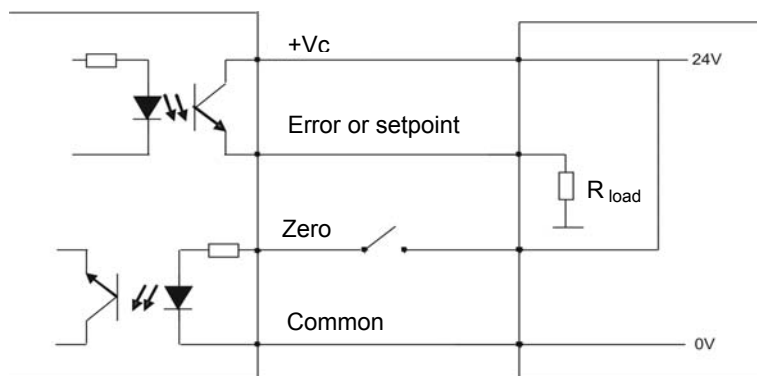
There are 2 analogue outputs on FAA-25, one is for 0 – 10 volt and the other for 4 – 20 mA. But only one of them can be used at the same time and has to be selected in the setup mode. The wiring of the analogue output should be done according to the pin configuration given in the table below.

Pin	Definition
V	0 – 10 V output (+ Signal)
I	0 – 20 mA output (+ Signal)
G	GND (- Signal)
	Shield

2.5. Optional Digital Inputs / Outputs

Optionally two setpoint outputs, one error output and one zeroing input can be added to type FAA-25. If an input signal is supplied to the zeroing input, the analogue output signal of FAA-25 will be set to “0 kg”. The setpoints will be active when the weight value is higher than the entered setpoint value. If any failure occurs within FAA-25, an error output will be indicated with the LED on the front panel.

If you want to use these I/O, prepare the circuits as shown below.



Error Output	
Status	Definition
1	OK
0	Error

Figure 2. Optional digital I/O connection diagram and error output description

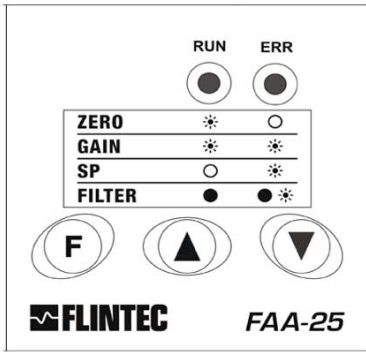
2.6. Optional RS232C Serial Interface

The optional serial interface can be used for eCAL (electronic calibration), adjusting filters, entering setpoint values, exporting status information, etc. The pin configuration is shown in Figure 1.

2.7. Commissioning

After making the connections of FAA-25 as described above, energize FAA-25 carefully. Then set the instrument to the desired analogue output mode and perform the setup and calibration operations. Check the performance of your system with different test weights. After you have assured the accuracy of the system you can use it.

3. Operation



There are 2 LEDs and 3 keys on the front panel of FAA-25. The keys are used for setup and adjustments and the LEDs have different meaning in operation and setup mode. The usage of the keys is described in chapter 4.

In operation mode with connected electrical load the green RUN LED is on and the red ERROR LED is off. See chapter 6 in case of the red LED turns on.

The status of the LEDs during normal operation is given in the table below.

In normal operation	0 – 10 V output	4 – 20 mA output
Green RUN LED	Flashes (on for 4 seconds)	On
Red ERROR LED	Off	Off

For troubleshooting see chapter 6.

The analogue output signal gives information about the status of the system and the weighing process:

Condition	0 – 10 V output	4 – 20 mA output	Error (option)
Operation	X	X	High
Setup	X	X	Low
Weight is higher than the range (Over)	13 V	24 mA	Low
Weight is lower than the zero range (Under)	-1.4 V	0 mA	Low
System Error	13 V	24 mA	Low
ADC is out of operating range	-1.4 V	0 mA	Low

4. Setup and Calibration by using the Key Buttons

During the power on period the green and red LEDs are lightened for 3 seconds. After both LEDs turned off for a short period, one of them will be lightened. If you did not follow this LED signalization sequence, power off the instrument, check the power and the load cell cables and power it on again.



In this step the lightened LED informs you about the active analogue output mode of the instrument. If the green RUN LED is continuously lightened, the analogue output mode is 4 – 20 mA; if it flashes, the analogue output mode is 0 – 10 V (the electrical load should be connected before). If the planned usage is different from the active mode, you have to select the analogue output mode first, see Chapter 4.1.

After this the instrument is set up and calibrate as described in Chapter 4.2.

Finally check the performance of your system with different test weights. After being sure of the accuracy of the system you can use it.

4.1. Setup of the Analogue Output Mode

The selected analogue output mode (voltage or current) is indicated by the RUN LED and the ERROR LED as described in chapter 3.




If you want to change the analogue output mode press  and  keys simultaneously.

If you have changed the analogue output mode, you have to recalibrate the transmitter – regardless if it has already been calibrated for the other output mode.

4.2. Setup and Calibration

Warning: The analogue output mode shall be selected as 0 – 10 V or 4 – 20 mA before the calibration. Do not forget to calibrate the instrument after changing the analogue output mode.

In this chapter you will find the required information for the setup and the calibration of FAA-25. The symbols at the right bottom of the keys show the function of the keys in setup mode. The meanings of the keys in the setup mode are given in the table below.

		
<ul style="list-style-type: none"> Enter / exit the setup mode Go to the next step Save 	<ul style="list-style-type: none"> Increase the value Setup Setpoint no. 1 Filter type "High" 	<ul style="list-style-type: none"> Decrease the value Setup Setpoint no. 2 Filter type "Low"

4.2.1. Entering Setup & Calibration

Press **(F)** and **(V)** keys simultaneously to enter the “Setup and Calibration” menu. The transmitter indicates the started setup mode by flashing the two LEDs on the front panel three times sequentially. Then the green LED flashes.

4.2.2. Setup & Calibration

The status of the LEDs on the front panel indicates the setup step. You can go to the next step by pressing the **(F)** key (in setup mode).

Setup steps	RUN LED	ERR LED	Description
	green	red	
Zero adjustment* ←-----↑ ↓	☀ Flash	● Off	Zero and span adjustment are made in three different speeds: <ul style="list-style-type: none"> • If you press the arrow key to the desired direction repeatedly, the value will be changed slowly. • If you press the arrow key continuously the value will be changed with medium speed. • If you press the other arrow key while pressing the desired direction's key continuously the value will be changed quickly (coarse adjustment). Unload the scale. Adjust the analogue output to 0 V or 4 mA by using the arrow keys (▲) (increase) and (▼) (decrease). Save by pressing the (F) key. If you press the (F) key without pressing any arrow key you will skip this step.
Span adjustment* ↓	☀ Flash	☀ Flash	Load the scale. The load value must be between 10% and 100% of the maximum weight to measure. Adjust the analogue output to the required value for this load by using the arrow keys keys (▲) (increase) and (▼) (decrease). Save by pressing the (F) key. If you press the (F) key without pressing any arrow key you will skip this step.
Setpoint entry ↓	● Off	☀ Flash	Put a load equal to the desired setpoint value on the scale. Press (▲) to assign this value as the first setpoint value (O1) OR press (▼) key to assign this value as the second setpoint value (O2). Save by pressing the (F) key. If you press the (F) key without pressing any arrow key you will skip this step.
Filter selection ↓-----→	○ On ○ On	○ On ☀ Flash	High filtering (lower frequency cut-off; longer settling time; factory default) If you press the (▼) key in this step, the filter type will be set to “High”. Low filtering (higher frequency cut-off; shorter settling time) If you press the (▲) key, the filter type will be set to “Low”. For increasing the stability of the weighing system try the “High” filter first. If you need a faster response in your application set the filter type to “Low”. Save by pressing the (F) key. If you press the (F) key without pressing any arrow key you will skip this step.
Exit and save changes			Press the (F) and the (V) keys simultaneously to exit from the setup mode and return to the operation mode. Without doing this step the amplifier will lose all changes after power off.

* After 20 s without user interaction FAA-25 leaves the “Setup & Calibration” menu automatically.

4.2.3. Exit from Setup & Calibration

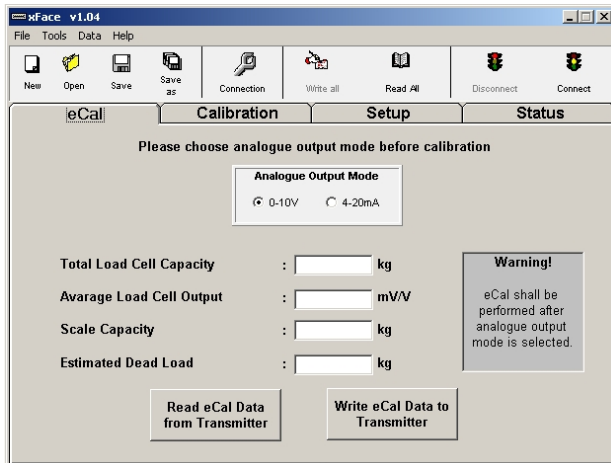
Press the **(F)** and the **(V)** keys simultaneously to save the changes, exit from the setup mode and return to the operation mode.

5. Setup and Calibration via Serial Interface

If the FAA-25 amplifier includes an optional RS232C serial interface, you can perform eCal (electronic calibration), normal calibration, adjust the filter, download setpoint values and indicate status information by using the xFace software installed on a PC (valid for device serial no. J800110831 or higher; older devices require the eCal-Transmitter software).

The minimum PC requirements are: MS Windows XP or Vista operating system
RS232C serial interface
Serial cable for RS232C signals between FAA-25 and PC

The xFace software for installation can be found on the Flintec CD-ROM in the directory "Software\Software for Flintec Products\FAA-25".



The main tab of this software is shown at the left.

eCal is made very easy:

1. Enter the total load cell capacity in [kg], the averaged load cell's rated output in [mV/V], the scale capacity in [kg] and the estimated dead load value in [kg] into the eCal window.

2. Click the button "Write eCal Data to Transmitter".

After performing eCal as described in the software manual, check the performance of your system. After you have assured the accuracy of the system you can use it. You can find essential information for using the xFace software in its help file.

6. Troubleshooting

The type FAA25 amplifier has been designed as a very reliable and virtually error free instrument. However if an error occurs do not attempt to repair the equipment before you understand what caused the error. Note the status of the front panel LEDs, and try to find the problem with the help of the table given below. Don't let unauthorized people interfere with the instrument.

In case of an error the ERR LED indicates the analogue output mode like the RUN LED.

If the output mode is set to 4 -20 mA, the ERR LED lights continuously in case of an error. If the analogue output mode is set to 0 – 10 V, the ERROR LED flashes.

FRONT PANEL LEDES		ERROR OUTPUT (Option)	DEFINITION
Green RUN LED	Red ERROR LED		
On / Flashing	Off	1	<ul style="list-style-type: none"> Normal operation
Off	Off	0	<ul style="list-style-type: none"> No power Board failure
Off	On / Flashing	0	<ul style="list-style-type: none"> Input signal is out of range Calibration needed Check output circuit & cables Board failure

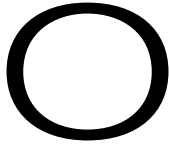
The analogue output also gives additional information about the weighing system as described in chapter 3.

If the calibration was done wrong (e.g. the adjustment of the zero and the span was done with the same load by accident) then following procedure has to be done:

1. De-power FAA-25 and re-power it again.
2. Switch the analogue output to the other non-active output mode.
3. Perform a „rough“ zero and span adjustment according chapter 4.2.2 respective chapter 5.
4. Switch the analogue output back to the wished output mode.
5. Perform a proper adjustment according chapter 4.2.2 respective chapter 5.

7. Declaration of Conformity

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Konformitätserklärung
Declaration of conformity
Déclaration de conformité

Hersteller:
Manufacturer.
Fabricant:

Flintec GmbH

Typ/ Modell:
Type / Model:
Type / modèle:

FAA-25

entspricht dem in der Bescheinigung über die Bauartzulassung beschriebenen Baumuster sowie den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung und den Anforderungen folgender Richtlinien:

corresponds to the production model described in the EC type-approval certificate and to the requirements of the Council Directive 90/384/EEC as amended and to the requirements of the following EC directives:

correspond au modèle décrit dans le certificat d'approbation CE de type, aux exigences de la directive 90/384/CEE modifiée et aux exigences des directives CE suivantes:

89/336/EWG	89/336/EE	89/336/CEE
73/23/EWG	73/23/EEC	73/23/CEE

entsprechend den folgenden Normen:
in conformity with the following standards:
conforme aux normes suivantes:

EN 45501
EN 50081-1
EN 50082-1
EN 60950

Diese Erklärung gilt nur in Verbindung mit einer Konformitätsbescheinigung einer benannten Stelle.

This declaration is only valid with a certificate of conformity by a notified body.

Cette déclaration est valide seulement avec une attestation de conformité d'un organisme notifié.

Unterschrift
Signature
Signature

Datum 8. Februar 2007
Date 8th February 2007
Date 8ième février 2007

A handwritten signature in black ink, appearing to read "G. Adam".

Gerhard K. Adam
Geschäftsführer
General Manager
Directeur

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