JetWeb

JX6-AD8

Submodule

Operator's Manual

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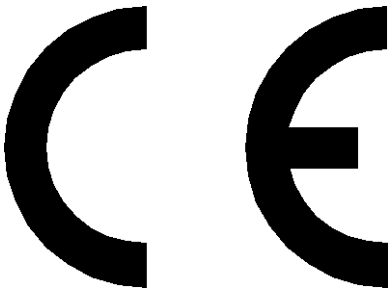
This Operator's Manual is an Integral Part of the JetWeb-System Submodule JX6-AD8:

Type: _____

Serial No: _____

Year of Manufacture: _____

Order No: _____



To be entered by the customer:

Inventory No: _____

Place of operation: _____

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1 Word of Advice on this Manual

1.1 Meaning

This manual is an integral part of the JetWeb submodule JX6-AD8, and

- must be kept in a way that it is always at hand until the JetWeb submodule JX6-DA4 will be disposed of.
- If the JetWeb submodule JX6-AD8 is sold, transferred or lent, this manual must be handed over.

In any case you encounter difficulties to clearly understand this manual, please contact the manufacturer.
We would appreciate any suggestions and contributions on your part and would ask you to contact us. This will help us to produce manuals that are more user-friendly and to address your wishes and requirements.

Missing or inadequate knowledge of the manual results in the loss of any claim of liability on part of Jetter AG. Therefore, the operating company is recommended to have the instruction of the persons concerned confirmed in writing.

Maintenance of the JetWeb Submodule Jx6-AD8

The JetWeb Submodule JX6-AD8 is maintenance-free. Therefore, no inspection or maintenance works are required for the operation of the module.

Decommissioning and disposal of the JetWeb Submodule JX6-AD8

Decommissioning and disposal of the JetWeb Submodule JX6-AD8 are subject to the environmental legislation of the respective country in effect for the operator's premises.

1.2 Description of Symbols

Warning

This sign is to indicate a possible impending danger of serious injury or death.

Caution

This sign is to indicate a possible impending danger of light injury. This sign is also to warn you of material damage.

Important

This sign is to indicate a possible impending situation which might bring damage to the product or to its surroundings.

Note

You will be informed of various possible applications and will receive further useful suggestions.

- / - Enumerations are marked by full stops, strokes or scores.

Operating instructions are marked by this arrow.

Automatically running processes or results to be achieved are marked by this arrow.

(D) PC and user interface keys.

2 Safety Instructions

2.1 General Safety Instructions

The JetWeb Submodule JX6-AD8 is in line with the current state of the art. The JetWeb Submodule JX6-AD8 complies with the valid safety regulations and standards. Special emphasis was given to the safety of the users.

Of course, the user should adhere to the following regulations:

- relevant accident prevention regulations;
- accepted safety rules;
- EU guidelines and other country-specific regulations.

Usage as Agreed Upon

The JetWeb Submodule JX6-AD8 is used for acquiring analog voltages or currents.
The submodule is supplied with power by the basic module. The following controllers can be used as basic modules: D-CPU, and JC 647, as well as the peripheral modules JX6-CON1, or JX6-CON+. The supply voltage is 24 V DC. This operating voltage is classified as SELV (Safety Extra Low Voltage). Thus, the JetWeb Submodule JX6-AD8 is not subject to the EC “Low Voltage Directive" (LVD).

The JetWeb Submodule JX6-AD8 must be operated within the limits of the technical data given in chapter 4.

Important !

➢ The JetWeb Submodule JX6-AD8 may only be inserted into the sockets of the basic modules D-CPU and JC 647 or peripheral modules JX6-CON1, and JX6-CON+ intended for this purpose.

Usage Other Than Agreed Upon

The JetWeb Submodule JX6-AD8 must not be used in technical systems which to a high degree have to be fail-safe, e.g. ropeways and aeroplanes.

If the JetWeb Submodul JX6-AD8 is to be run under surrounding conditions, which differ from the conditions mentioned in chapter Technical Data, the manufacturer is to be contacted beforehand.

Installation and Maintenance

Mounting, backfitting, maintenance and repair may only be carried out by specially trained personnel, as specific know-how will be required.

➢ Isolate the controller from the mains (pull out the mains plug) when working on the control system.

Modifications and Alterations to the Module

Important !

Due to safety reasons, no modifications and alterations to the JetWeb Submodule JX6-AD8 and its functions are allowed. Any modifications to this module not expressly authorised by JETTER AG will result in a loss of any liability claims to Jetter AG.

The original parts are specifically designed for the JetWeb Submodule JX6-AD8. Third-party parts and equipment are not tested on our part, and are therefore not released by us. The installation of such parts may impair the safety and the proper functioning of the JetWeb Submodule JX6-AD8.

Any liability on the part of Jetter AG for any damages resulting from the use of non original parts and equipment is excluded.

Malfunctions

➢ Malfunctions or other damages are to be reported to an authorized person immediately.
Safeguard the JetWeb Submodule JX6-AD8 against misuse or accidental use.

Only qualified experts are allowed to carry out repairs.

Information Signs and Labels

- Nameplates, information signs, and labels always have to be observed and kept readable.
- Damaged or unreadable information signs and labels are to be exchanged.

Earthing procedure

- Screw down the JX6 housing to a highly conductive and earthed mounting plate.
- An earth-terminal screw with a M4 thread is located on the top face of the JX6 housing.
  This earthing screw shall electrically be connected to a PE terminal in the electric cabinet by means of a PE conductor (conductor area 1.5 mm², colour green-yellow) (refer to Fig. 1).

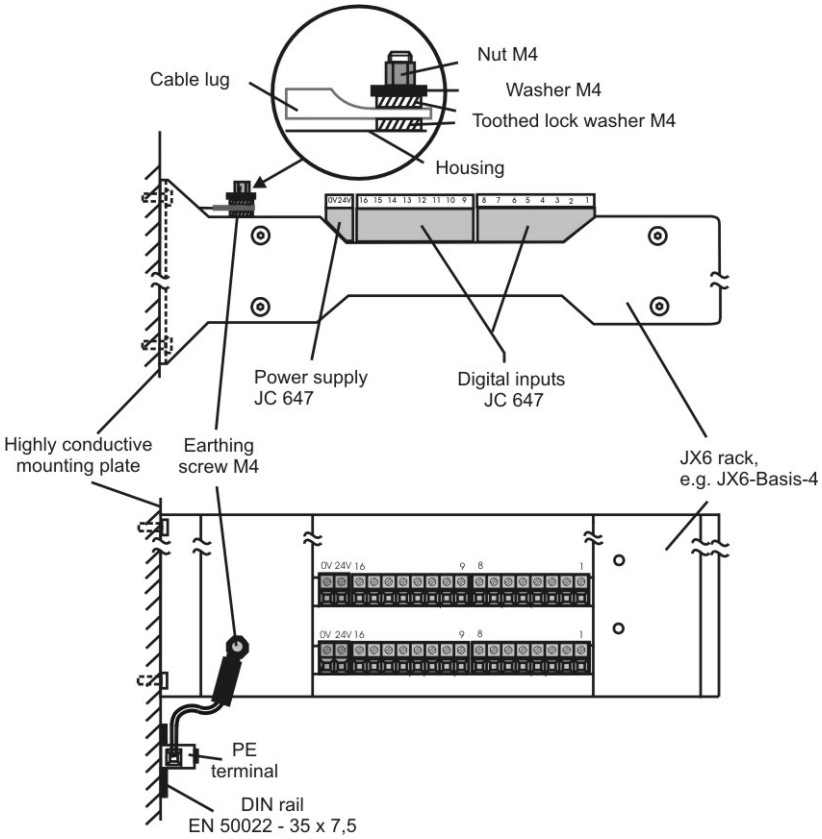


Fig. 1: Earthing, JX6 housing

2.2 Instructions on EMI

The noise immunity of a system corresponds to the weakest component of the system.

For this reason, correct wiring and shielding of the cables is important.

Important !

Measures for increasing immunity to interference:

- Shield cables on both ends.
- The entire shield must be drawn behind the isolation, and then be clamped under an earthed strain relief with the greatest possible surface area.

When male connectors are used:

- Only use metallized connectors, e.g. SUB-D with metallized housing. Please take care of direct connection of the strain relief with the housing here as well (refer to Fig. 2).

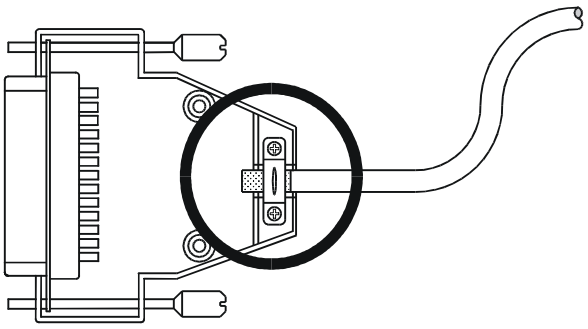


Fig. 2: Shielding of SUB-D connectors in conformity with the EMC standards.

- As a rule, physical separation should be maintained between signal and power lines.
- It is of great importance that the JX6 housing is screwed down to a highly conductive mounting plate.

3 Physical Dimensions

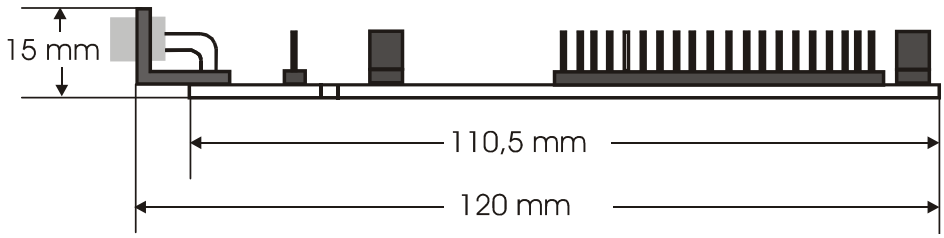


Fig. 3: Side View of the JX6-AD8 Submodule

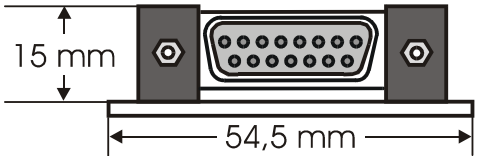


Fig. 4: Front View of the JX6-AD8 Submodule

Design	
Dimensions (H x W x D in mm)	15.0 x 54.5 x 110.5
Installation	Can be plugged into socket # 1, 2 or 3 of the controller JC 647 Can be plugged into socket # 1 or 2 of the controller D-CPU Can be plugged into socket # 1, 2 or 3 of the peripheral modules JX6-CON1, or JX6-CON+

4 Technical Data

Functional Data	
Number of inputs	Voltage channels: 8 single-ended channels max. 4 differential channels max. Current channels: 4 single-ended channels max. 4 differential channels max. Channel-wise configuration Cyclical conversion of 1 to 8 voltages (depending on input configuration)
Resolution	16 bits
Voltage range Value range	-10 V ... +10 V -32768 ... +32767
Current range 1 Value range	-20 mA ... +20 mA -32768 ... +32767
Current range 2 Value range	4 mA … +20 mA 6554 ... +32767
Sampling interval	min. 1 ms per channel
Absolute error (Voltage)	max. 0.3 %
Absolute error (Current)	max. 0.4 %

Electrica Data	
Power supply of JX6-AD8 + 24 V, and +/- 15 V	• Through submodule socket # 1, 2 or 3 of the controller JC 647 • Through submodule socket # 1 or 2 of the controller D-CPU • Through socket # 1, 2 or 3 of the peripheral modules JX6-CON1, or JX6-CON+
Input impedance - Voltage: - Current:	 55 kΩ 100 Ω
Electrical isolation	None
Power supply provided by JX6-AD8	+/- 15 V / 5 mA

Operating Parameters **JX6-AD8 submodule is plugged into a D-CPU, or JC 647**
The operating parameters of the controller D-CPU, and JC 647 do apply.

Operating Parameters **JX6-AD8 submodule is plugged into a JX6-CON1, or JX6-CON+**
The operating parameters of the peripheral modules JX6-CON1, and JX6-CON+ do apply.

5 Input Circuit

5.1 Single-ended Voltage Channel

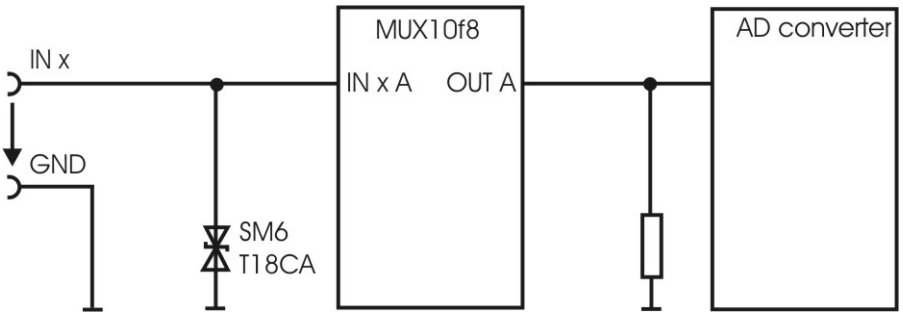


Fig. 5: Single-ended Voltage Channel

5.2 Differential Voltage Channel

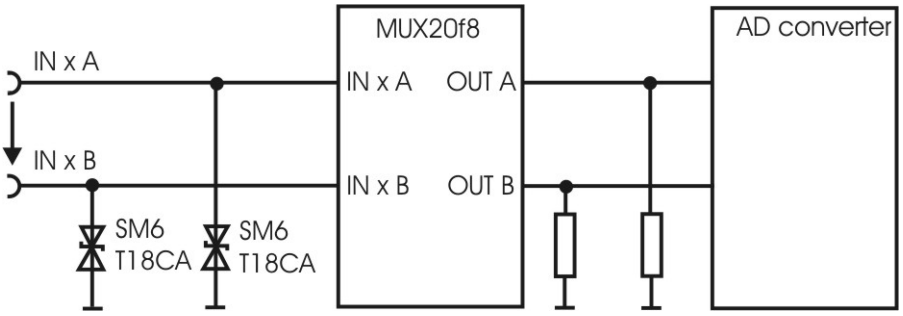


Fig. 6: Differential Voltage Channel

5.3 Single-ended Current Channel

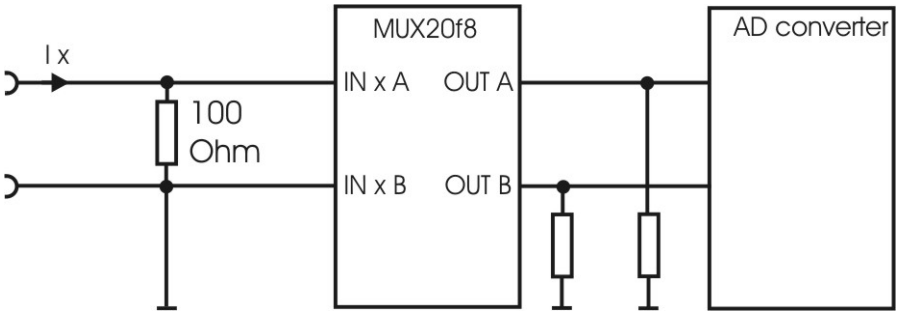


Fig. 7: Single-ended Current Channel

5.4 Differential Current Channel

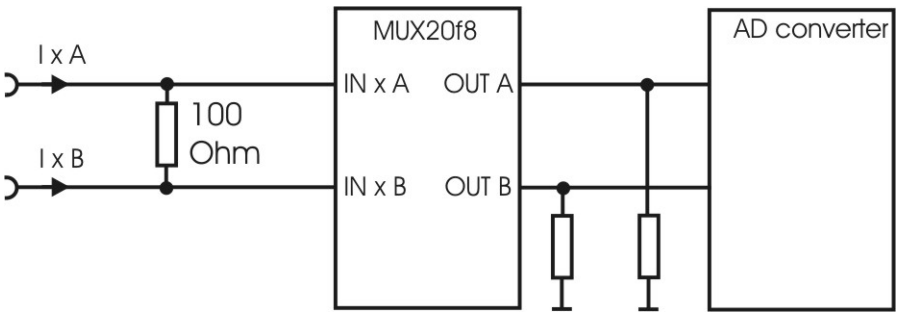


Fig. 8: Differential Current Channel

6 Configuration of Analog Inputs

The AD converter cyclically converts one to eight voltages.

Through a configuration (input configuration) the following parameters can be specified:

- Single-ended voltage channel (with reference to ground)
- Differential voltage channel
- Single-ended current channel (with reference to ground)
- Differential current channel

- Voltage range: -10 ... +10 V
- Current range: -20 ... +20 mA
- Current range: 4 ... 20 mA

Only voltages (currents) of inputs, that have been configured beforehand, are converted.

1 to 8 configurations are possible. Each configuration is written into a register.

The number and the kind of possible configurations depend on the quantity of voltages (currents) to be converted.

Reason:
Since every voltage or current measurement requires a configuration, the following combinations are possible:

- max. 8 single-ended voltage channels
- max. 4 differential-mode current channels
- max. 4 single-ended current channels
- max. 4 differential-mode current channels
- or a combination out of them.

Per current channel one differential voltage less can be converted.

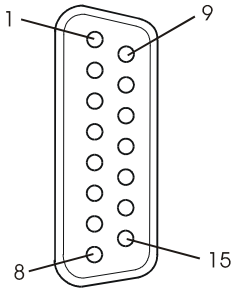
Input Configuration		
		Register Value
Single-ended	-20 .. +20 mA	3
	4 .. 20 mA	17
	-10 .. +10 V	8
Differential mode	-20 .. +20 mA	7
	4 .. 20 mA	21
	-10 .. +10 V	12

The register number depends on the basic module and the socket number (for more information please refer to the description of registers in chapter 7 "JX6-AD8 Submodule - Firmware

In chapter 6.1 an example of the input configuration is given.

6.1 Description of Connections

6.1.1 Analog Voltage Channels

Pin Assignment - Female SUB-D connector, 15 pins			
			
Pin	**Signal**		**Comment**
	Single-ended	**Differential mode IN x A -> IN x B**	
1	GND		Reference potential
2	IN1	IN1 A	Analog input
3	IN2	IN2 A	Analog input
4	IN3	IN3 A	Analog input
5	IN4	IN4 A	Analog input
6	IN5	IN1 B	Analog input
7	IN6	IN2 B	Analog input
8	IN7	IN3 B	Analog input
9	IN8	IN4 B	Analog input
10	Not assigned		
11	+15V		Loadability: 5 mA
12	-15V		Loadability: 5 mA
13	GND		Reference potential
14	Not assigned		
15	Not assigned		

Caution

Important !

Do not connect any voltage sources to pin 1, 11, 12 and 13.
This will result in damages to the product.

Example of an input configuration

Input 1:	Single-ended voltage (IN1)
Input 2:	Differential voltage (IN2 A)
Input 3:	Differential voltage (IN3 A)
Input 4:	Single-ended voltage (IN4)
Input 5:	Single-ended voltage (IN5)
Input 6:	Differential voltage (IN2 B)
Input 7:	Differential voltage (IN3 B)
Input 8:	Single-ended voltage (IN8)

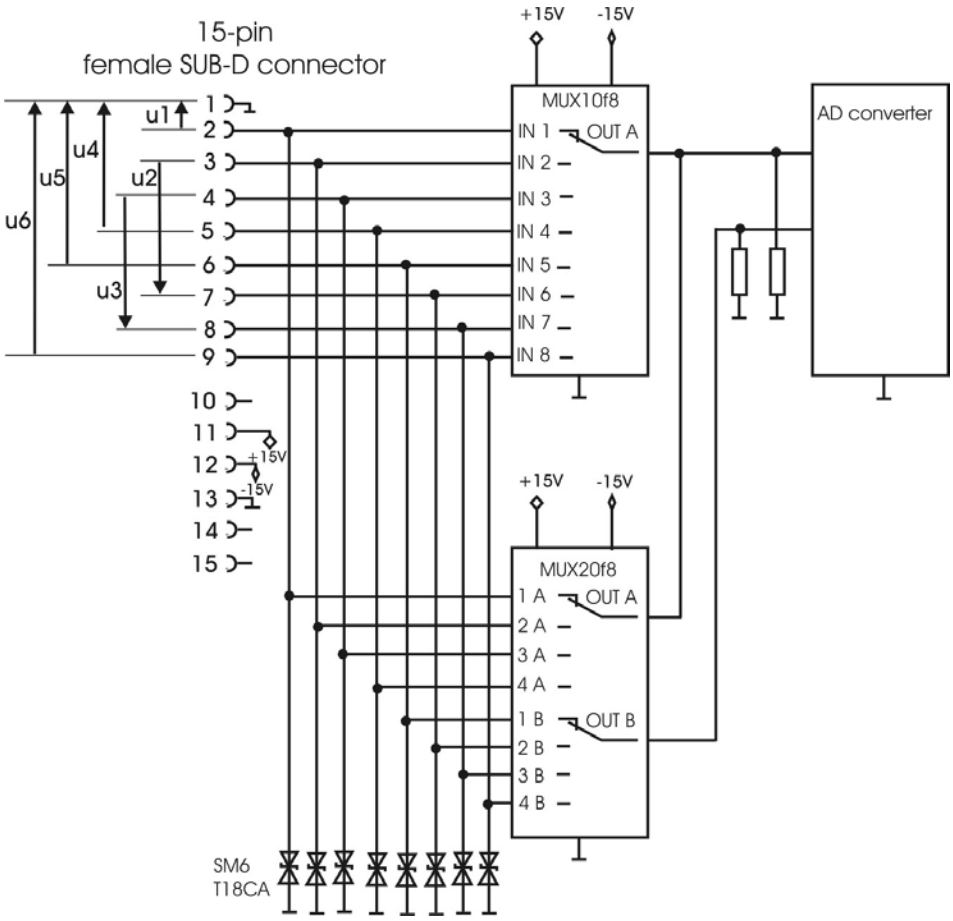


Fig. 9: Voltage channels of the JX6-AD8 Submodule

Note!

Instead of one differential voltage, two voltages with reference to ground can be measured.
This configuration is shown in Fig. 9.

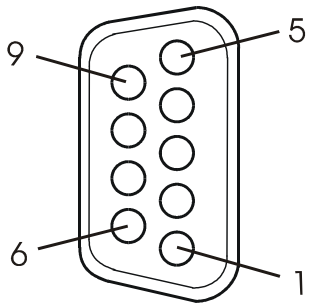
In the given example, altogether 4 input channel configurations are required.

Registers	Register Value	Input Configuration
Configuration of AD channel # 1	8	Single-ended -10 ... +10V
Configuration of AD channel # 2	12	Differential mode -10 ... +10V
Configuration of AD channel # 3	12	Differential mode -10 ... +10V
Configuration of AD channel # 4	8	Single-ended -10 ... +10V
Configuration of AD channel # 5	8	Single-ended -10 ... +10V
Configuration of AD channel # 8	8	Single-ended -10 ... +10V

Register with converted digital value	Analog signal
Actual value of AD conversion - channel # 1	Voltage u1
Actual value of AD conversion - channel # 2	Voltage u2
Actual value of AD conversion - channel # 3	Voltage u3
Actual value of AD conversion - channel # 4	Voltage u4
Actual value of AD conversion - channel # 5	Voltage u5
Actual value of AD conversion - channel # 8	Voltage u6

6.1.2 Analog Current Channels

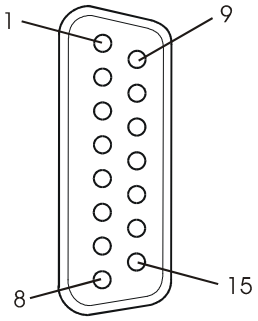
The submodule AD8 is plugged into socket # 1 or 2 of the peripheral module JX6-CON1, or JX6-CON+.

Pin Assignment - Female SUB-D connector, 9 pins		
		
Pin	**Signal**	**Comment**
	Differential mode IN x A -> IN x B	
1	GND	Reference potential
2	IN4 B	Analog input
3	IN3 B	Analog input
4	IN2 B	Analog input
5	IN1 B	Analog input
6	IN4 A	Analog input
7	IN3 A	Analog input
8	IN2 A	Analog input
9	IN1 A	Analog input

Note!

The differential current channel can be converted into a single-ended current channel by connecting pins 2, 3, 4 resp. 5 to GND.

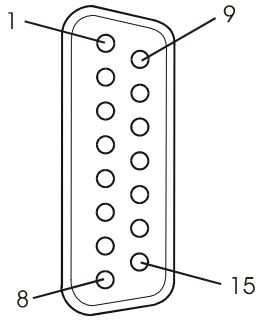
The submodule AD8 is plugged into socket # 3 of the peripheral module JX6-CON1, or JX6-CON+.

Pin Assignment - Female SUB-D connector, 15 pins			
			
Pin	**Signal**		**Comment**
	Single-ended	**Differen-tial mode IN x A -> IN x B**	
1	GND		Reference potential
2	IN1	IN1 A	Analog input
3	IN2	IN2 A	Analog input
4	IN3	IN3 A	Analog input
5	IN4	IN4 A	Analog input
6	GND	IN1 B	Analog input
7	GND	IN2 B	Analog input
8	GND	IN3 B	Analog input
9	GND	IN4 B	Analog input

Note!

For this submodule socket no 9-pin female SUB-D connector is available.
By inserting specific jumpers on the JX6-AD8 submodule, current channels (current inputs) can be allocated to the 15-pin female Sub-D connector (see chapter 6.1.3).

Controller D-CPU, submodule socket # 1 and 2
Controller JC 647, submodule socket # 1, 2, and 3

Pin Assignment - Female SUB-D connector, 15 pins			
			
Pin	**Signal**		**Comment**
	Single-ended	**Differential mode IN x A -> IN x B**	
1	GND		Reference potential
2	IN1	IN1 A	Analog input
3	IN2	IN2 A	Analog input
4	IN3	IN3 A	Analog input
5	IN4	IN4 A	Analog input
6	GND	IN1 B	Analog input
7	GND	IN2 B	Analog input
8	GND	IN3 B	Analog input
9	GND	IN4 B	Analog input

Note!

For this submodule socket no 9-pin female SUB-D connector is available.
By inserting specific jumpers on the JX6-AD8 submodule, current channels (current inputs) can be allocated to the 15-pin female Sub-D connector (see chapter 6.1.3).

6.1.3 Jumper Settings

By inserting specific jumpers on the JX6-AD8 submodule current channels can be allocated to the female Sub-D connector, 15 pins, located on the JX6-AD8 submodule.
This will be necessary, if

- there is no female Sub-D connector, 9 pins, at this socket.

Example of an input configuration

Input 1:	Single-ended current (i1)
Input 2:	Differential current (i2 A)
Input 3:	Differential voltage (u3 A)
Input 4:	Single-ended voltage (u4)
Input 5:	Single-ended current (GND)
Input 6:	Differential current (i2 B)
Input 7:	Differential voltage (u3 B)
Input 8:	Single-ended voltage (u5)

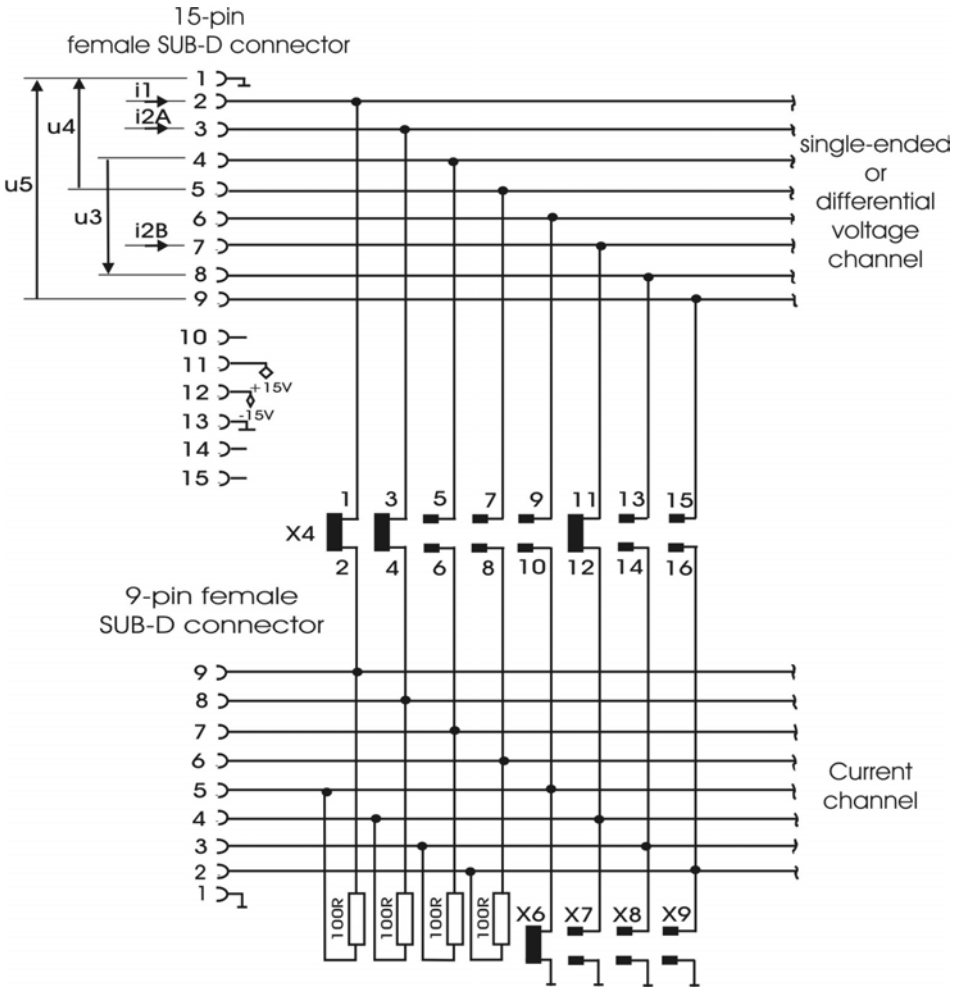


Fig. 10: Voltage and current channels of the JX6-AD8 submodule

Register with converted digital value	Analog signal
Actual value of AD conversion - channel # 1	Current i1
Actual value of AD conversion - channel # 2	Current (i2A - i2B)
Actual value of AD conversion - channel # 3	Voltage u3
Actual value of AD conversion - channel # 4	Voltage u4
Actual value of AD conversion - channel # 8	Voltage u5

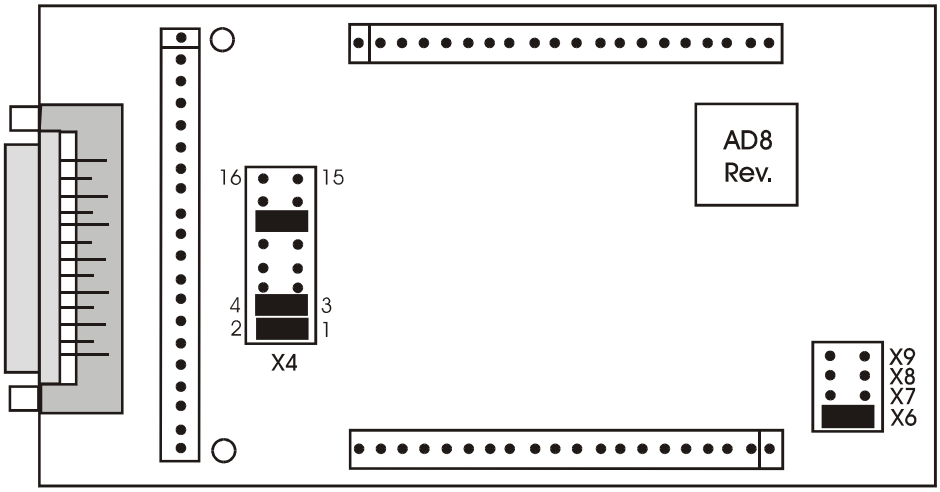


Fig. 11: Jumper configuration of the JX6-AD8 submodule

Allocation of current channels to the female Sub-D connector, 15 pins The following jumpers have to be inserted				
Current channel # 1	Single-ended	X4.1-2	and	X6
	Differential mode	X4.1-2	and	X4.9-10
Current channel # 2	Single-ended	X4.3-4	and	X7
	Differential mode	X4.3-4	and	X4.11-12
Current channel # 3	Single-ended	X4.5-6	and	X8
	Differential mode	X4.5-6	and	X4.13-14
Current channel # 4	Single-ended	X4.7-8	and	X9
	Differential mode	X4.7-8	and	X4.15-16

7 JX6-AD8 Submodule - Firmware

7.1 JX6-AD8 is plugged on a JC 647 controller

7.1.1 Addressing the submodule socket

Submodule socket # 1: y = 3
Submodule socket # 2: y = 4
Submodule socket # 3: y = 5

7.1.2 Overview of Registers

*) R/W: Read/Write; Ro: Read only

Reg. #	Type of register	R/W Ro*)
61688	Displaying the submodule type of socket # 1	Ro
61689	Displaying the submodule type of socket # 2	Ro
61692	Displaying the submodule type of socket # 3	Ro
63y51	Actual value of AD conversion - channel # 1	Ro
63y52	Actual value of AD conversion - channel # 2	Ro
63y53	Actual value of AD conversion - channel # 3	Ro
63y54	Actual value of AD conversion - channel # 4	Ro
63y55	Actual value of AD conversion - channel # 5	Ro
63y56	Actual value of AD conversion - channel # 6	Ro
63y57	Actual value of AD conversion - channel # 7	Ro
63y58	Actual value of AD conversion - channel # 8	Ro
63y59	Selecting the analog channels to be converted	R/W
63y61	Configuration of analog channel # 1	R/W
63y62	Configuration of analog channel # 2	R/W
63y63	Configuration of analog channel # 3	R/W
63y64	Configuration of analog channel # 4	R/W
63y65	Configuration of analog channel # 5	R/W

Reg. #	Type of register	R/W Ro*)
63y66	Configuration of analog channel # 6	R/W
63y67	Configuration of analog channel # 7	R/W
63y68	Configuration of analog channel # 8	R/W

7.1.3 Description of Registers

For each register, the following information will be given:

1. Function of the register resulting from a “reading access”, i.e. an instruction of the following kind: `REGISTER_LOAD (220, @63356).`
2. Function of the register resulting from a “write access”, i.e. an instruction of the following kind: `REGISTER_LOAD (63368, @120).`
3. Value range, i.e. valid numerical values for the registers.
4. Value of the register shortly after switching on the controller (or following RESET).
5. An example regarding the use of the register with a description of the effect resulting from the given instruction.

Register 61688: Displaying the submodule type of socket # 1	
Function	**Description**
Read	Displaying the submodule type of socket # 1
Write	Illegal
Value range	1 to 6, 72 to 76, 99
Value after reset	99

Comment:
Register 61688 defining the submodule type is assigned to submodule socket # 1 of the JC 647 controller. The controller automatically detects what type of submodule is plugged into socket # 1.

Register Value	Submodule Type
99	No module installed
1	Reserved
2	Reserved
3	AD8_MODULE_TYPE
4	DA4_MODULE_TYPE
5	SV_MODULE_TYPE
6	PRN_MODULE_TYPE
72	INT_MODULE_TYPE
73	SB_MODULE_TYPE
74	AS-INTERFACE_MODULE_TYPE
75	PROFI_MODULE_TYPE
76	VCS_MODULE_TYPE

Register 61689: Displaying the submodule type of socket # 2	
Function	**Description**
Read	Displaying the submodule type of socket # 2
Write	Illegal
Value range	1 to 6, 72 to 76, 99
Value after reset	99

Comment:
Register 61689 defining the submodule type is assigned to submodule socket # 2 of the JC 647 controller. The controller automatically detects what type of submodule is located in socket # 2.

Register Value	Submodule Type
99	No module installed
1	Reserved
2	Reserved
3	AD8_MODULE_TYPE
4	DA4_MODULE_TYPE
5	SV_MODULE_TYPE

Register Value	Submodule Type
6	PRN_MODULE_TYPE
72	INT_MODULE_TYPE
73	SB_MODULE_TYPE
74	AS-INTERFACE_MODULE_TYPE
75	PROFI_MODULE_TYPE
76	VCS_MODULE_TYPE

Register 61692: Displaying the submodule type of socket # 3	
Function	**Description**
Read	Displaying the submodule type of socket # 3
Write	Illegal
Value range	1 to 6, 72 to 76, 99
Value after reset	99

Comment:
Register 61692 defining the submodule type is assigned to submodule socket # 3 of the JC 647 controller. The controller automatically detects what type of submodule is plugged into socket # 3.

Register Value	Submodule Type
99	No module installed
1	Reserved
2	Reserved
3	AD8_MODULE_TYPE
4	DA4_MODULE_TYPE
5	SV_MODULE_TYPE
6	PRN_MODULE_TYPE
72	INT_MODULE_TYPE
73	SB_MODULE_TYPE
74	AS-INTERFACE_MODULE_TYPE
75	PROFI_MODULE_TYPE
76	VCS_MODULE_TYPE

Register 63y51: Actual value of AD conversion - channel # 1	
Function	**Description**
Read	Actual value after AD conversion of signal IN1 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Example:

Querying and processing the actual value of channel # 1.
On access to this register AD conversion is started.
After approx. 600 µs the converted digital value will be available.
The measured voltage ranging between -10 V and +10 V is converted into a digital value with a resolution of 16 Bit (65536).
The value range is between -32768 and +32767. One digit, i.e. the least voltage difference subject to conversion, is approx. 0.3 mV.
The submodule is placed in socket # 2.

```
    THEN
      REGISTER_LOAD (rADValue, @63451)
```

Register 63y52: Actual value of AD conversion - channel # 2	
Function	**Description**
Read	Actual value after AD conversion of signal IN2 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y53: Actual value of AD conversion - channel # 3	
Function	**Description**
Read	Actual value after AD conversion of signal IN3 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y54: Actual value of AD conversion - channel # 4	
Function	**Description**
Read	Actual value after AD conversion of signal IN4 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y55: Actual value of AD conversion - channel # 5	
Function	**Description**
Read	Actual value after AD conversion of signal IN5 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y56: Actual value of AD conversion - channel # 6	
Function	**Description**
Read	Actual value after AD conversion of signal IN6 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y57: Actual value of AD conversion - channel # 7	
Function	**Description**
Read	Actual value after AD conversion of signal IN7 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y58: Actual value of AD conversion - channel # 8	
Function	**Description**
Read	Actual value after AD conversion of signal IN8 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y59: Selecting the analog channels to be converted	
Function	**Description**
Read	Selected analog channels
Write	Selecting the analog channels to be converted
Value range	0 ... 255 (bit-coded)
Value after reset	255 (all eight channels have been selected for AD conversion)

Comment:

This register is for selecting the analog channels of the submodule JX6-AD8 the analog input voltage of which is to be converted. Thanks to this feature only the required AD channels have to be converted (scanned).

Bit 0:	Selecting analog channel # 1	1 =	Analog channel # 1 has been selected for AD conversion
		0 =	Analog channel # 1 has not been selected for AD conversion
Bit 1:	Selecting analog channel # 2	1 =	Analog channel # 2 has been selected for AD conversion
		0 =	Analog channel # 2 has not been selected for AD conversion
Bit 2:	Selecting analog channel # 3	1 =	Analog channel # 3 has been selected for AD conversion
		0 =	Analog channel # 3 has not been selected for AD conversion
Bit 3:	Selecting analog channel # 4	1 =	Analog channel # 4 has been selected for AD conversion
		0 =	Analog channel # 4 has not been selected for AD conversion

Bit 4:	Selecting analog channel # 5	1 =	Analog channel # 5 has been selected for AD conversion
		0 =	Analog channel # 5 has not been selected for AD conversion
Bit 5:	Selecting analog channel # 6	1 =	Analog channel # 6 has been selected for AD conversion
		0 =	Analog channel # 6 has not been selected for AD conversion
Bit 6:	Selecting analog channel # 7	1 =	Analog channel # 7 has been selected for AD conversion
		0 =	Analog channel # 7 has not been selected for AD conversion
Bit 7	Selecting analog channel # 8	1 =	Analog channel # 8 has been selected for AD conversion
		0 =	Analog channel # 8 has not been selected for AD conversion

The more channels are required, the longer the sampling interval for each AD channel of the JX6-AD8 submodule.
A set bit means that the corresponding channel is converted 1 ms times the number of selected channels (8 max.).

Example:

63359 = 1; AD channel # 1 is converted every 1 ms.

63359 = 3; AD channel # 1 and 2 are converted every 2 ms.

Note!

These bits can be queried, set or reset in a simple way using the **BIT_SET** and **BIT_CLEAR** instructions.

Register 63y61: Configuration of AD channel # 1	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Comment:

Through a configuration (input configuration), the following parameters can be specified:

Input Configuration		
		Register Value
Single-ended	-20 .. +20 mA	3
	4 .. 20 mA	17
	-10 .. +10 V	8
Differential mode	-20 .. +20 mA	7
	4 .. 20 mA	21
	-10 .. +10 V	12

Register 63y62: Configuration of AD channel # 2	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y63: Configuration of AD channel # 3	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y64: Configuration of AD channel # 4	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y65: Configuration of AD channel # 5	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y66: Configuration of AD channel # 6	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y67: Configuration of AD channel # 7	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y68: Configuration of AD channel # 8	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

7.1.4 JX6-AD8 located in submodule socket # 1

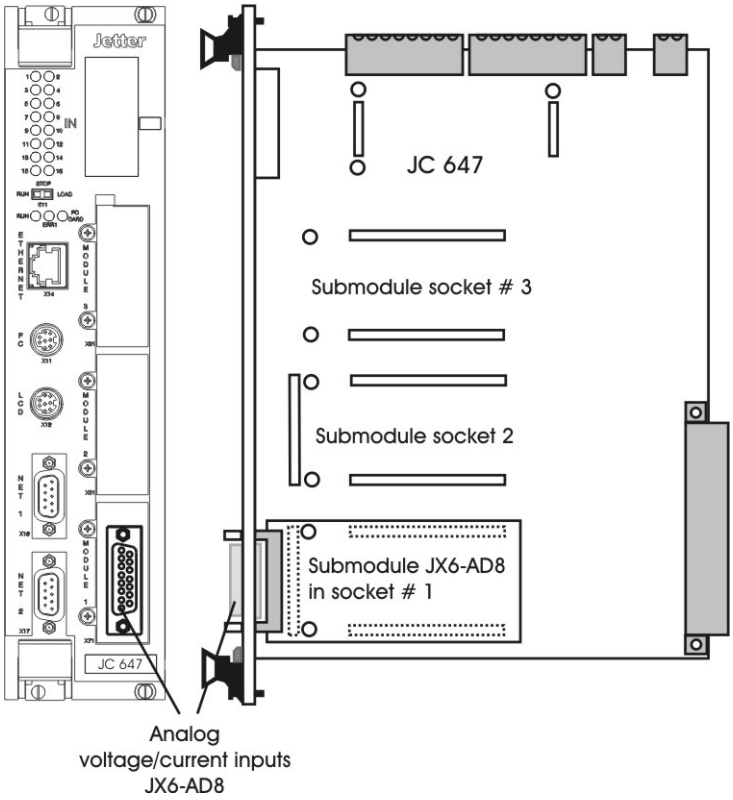


Fig. 12: JC 647 Controller, Submodule Socket # 1

Configuration

This configuration routine is required once at the beginning of the program.

➢ Configuration of Analog Inputs

Example: Configuration of AD channel # 1
; As differential voltage: -10 V ... +10 V
```
REGISTER_LOAD (63361, 12)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 1 after AD conversion

```
REGISTER_LOAD (rADValue, @63351)
```

7.1.5 JX6-AD8 located in submodule socket # 2

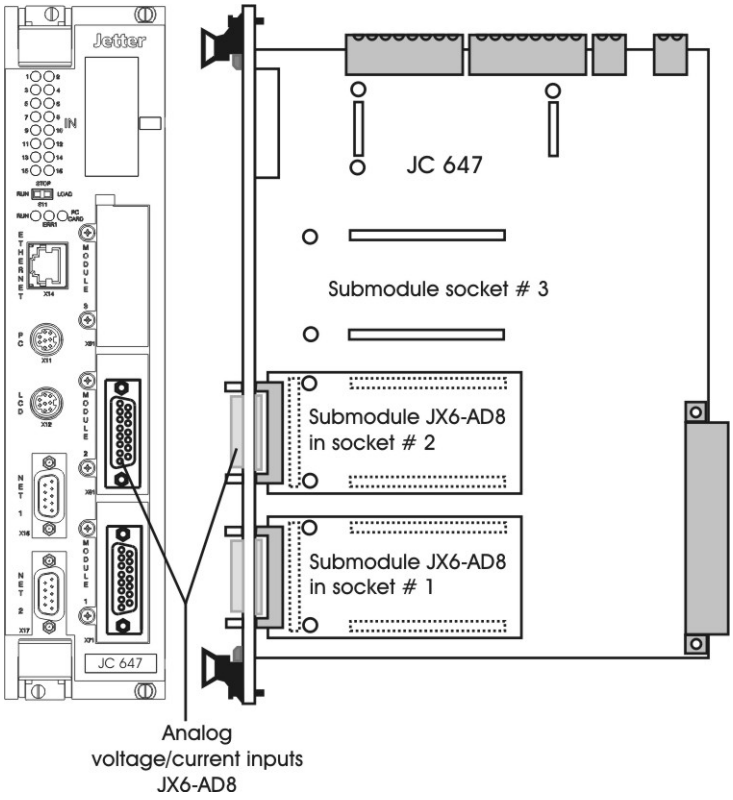


Fig. 13: JC 647 Controller, Submodule Socket # 2

Configuration

This configuration routine is required once at the beginning of the program.

➢ Configuration of Analog Inputs

Example: Configuration of AD channel # 2
; As differential voltage: -10 V ... +10 V
```
REGISTER_LOAD (63462, 12)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 2 after AD conversion

```
REGISTER_LOAD (rADValue, @63452)
```

7.1.6 JX6-AD8 located in submodule socket # 3

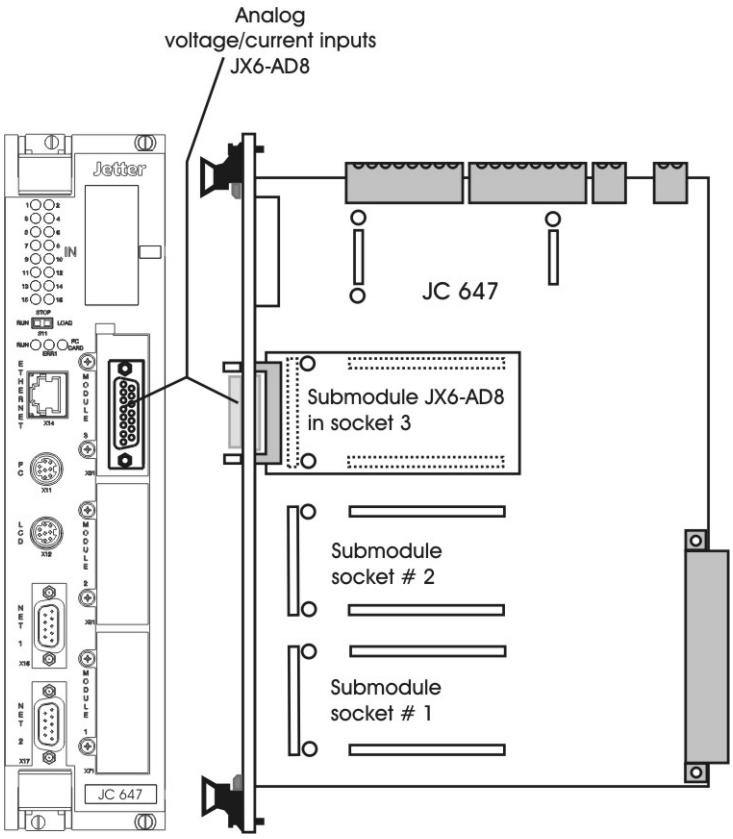


Fig. 14: JC 647 Controller, Submodule Socket # 3

Configuration

This configuration routine is required once at the beginning of the program.

➢ Configuration of Analog Inputs

Example: Configuration of AD channel # 2
; As differential voltage: -10 V ... +10 V
`REGISTER_LOAD (63562, 12)`

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 2 after AD conversion

```
REGISTER_LOAD (rADValue, @63552)
```

7.2 JX6-AD8 located on a D-CPU Controller

7.2.1 Addressing the submodule socket

Submodule socket # 1: y = 3
Submodule socket # 2: y = 4

7.2.2 Overview of Registers

*) R/W: Read/Write; Ro: Read only

Reg. #	Type of register	R/W Ro*)
61688	Setting the submodule type of socket # 1	R/W
61689	Setting the submodule type of socket # 2	R/W
63y05	Instruction register	R/W
63y51	Actual value of AD conversion - channel # 1	Ro
63y52	Actual value of AD conversion - channel # 2	Ro
63y53	Actual value of AD conversion - channel # 3	Ro
63y54	Actual value of AD conversion - channel # 4	Ro
63y55	Actual value of AD conversion - channel # 5	Ro
63y56	Actual value of AD conversion - channel # 6	Ro
63y57	Actual value of AD conversion - channel # 7	Ro
63y58	Actual value of AD conversion - channel # 8	Ro
63y61	Configuration of analog channel # 1	R/W
63y62	Configuration of analog channel # 2	R/W
63y63	Configuration of analog channel # 3	R/W
63y64	Configuration of analog channel # 4	R/W
63y65	Configuration of analog channel # 5	R/W
63y66	Configuration of analog channel # 6	R/W
63y67	Configuration of analog channel # 7	R/W
63y68	Configuration of analog channel # 8	R/W

7.2.3 Description of Registers

For each register, the following information will be given:

6. Function of the register resulting from a “reading access”, i.e. an instruction of the following kind: **`REGISTER_LOAD (220, @63356).`**
7. Function of the register resulting from a “write access”, i.e. an instruction of the following kind: **`REGISTER_LOAD (63368, @120).`**
8. Value range, i.e. valid numerical values for the registers.
9. Value of the register shortly after switching on the controller (or following RESET).
10. An example regarding the use of the register with a description of the effect resulting from the given instruction.

Register 61688: Setting the submodule type of socket # 1	
Function	**Description**
Read	Setting the submodule type of socket # 1
Write	New setting of submodule type, socket # 1
Value range	0 through 7
Value after reset	0

Comment:
Register 61688 defining the submodule type is assigned to submodule socket # 1 of the D-CPU controller.

```
; Setting the submodule type of JX6-AD8 located in socket # 1.
THEN
  REGISTER_LOAD (61688, 3)
```

Register Value	Submodule Type
0	No module installed
1	Reserved
2	Reserved
3	AD8_MODULE_TYPE
4	DA4_MODULE_TYPE
5	SV_MODULE_TYPE

Register Value	Submodule Type
6	PRN_MODULE_TYPE
7	Intelligent modulex (INT_MODULE_TYPE, SB_MODULE_TYPE, AS-INTERFACE_MODULE_TYPE, PROFI_MODULE_TYPE, VCS_MODULE_TYPE)

Register 61689: Setting the submodule type of socket # 2	
Function	**Description**
Read	Setting the submodule type of socket # 2
Write	New setting of submodule type, socket # 2
Value range	0 through 7
Value after reset	0

Comment:
Register 61689 defining the submodule type is assigned to submodule socket # 2 of the D-CPU controller.

```
; Setting the submodule type of JX6-AD8 located in socket # 1.
THEN
  REGISTER_LOAD (61689, 3)
```

Register Value	Submodule Type
0	No module installed
1	Reserved
2	Reserved
3	AD8_MODULE_TYPE
4	DA4_MODULE_TYPE
5	SV_MODULE_TYPE
6	PRN_MODULE_TYPE
7	Intelligent modulex (INT_MODULE_TYPE, SB_MODULE_TYPE, AS-INTERFACE_MODULE_TYPE, PROFI_MODULE_TYPE, VCS_MODULE_TYPE)

Register 63y05: Instruction Register	
Function	**Description**
Read	Not applicable
Write	Initializing the JX6-AD8
Value range	1
Value after reset	0

Comment:
Before the first AD conversion, the submodule JX6-AD8 has to be initialized for calibration purposes. The measuring range is linearized.

```
; Initializing the JX6-AD8 submodule located in socket # 1.
THEN
  REGISTER_LOAD (63305, 1)
```

Register 63y51: Actual value of AD conversion - channel # 1	
Function	**Description**
Read	Actual value after AD conversion of signal IN1 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Example:

Querying and processing the actual value of channel # 1.
On access to this register AD conversion is started.
After approx. 600 µs the converted digital value will be available.
The measured voltage ranging between -10 V and +10 V is converted into a digital value with a resolution of 16 Bit (65536).
The value range is between -32768 and +32767. One digit, i.e. the least voltage difference subject to conversion, is approx. 0.3 mV.
The submodule is placed in socket # 2.

```
THEN
  REGISTER_LOAD (rADValue, @63451)
```

Register 63y52: Actual value of AD conversion - channel # 2	
Function	**Description**
Read	Actual value after AD conversion of signal IN2 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y53: Actual value of AD conversion - channel # 3	
Function	**Description**
Read	Actual value after AD conversion of signal IN3 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y54: Actual value of AD conversion - channel # 4	
Function	**Description**
Read	Actual value after AD conversion of signal IN4 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y55: Actual value of AD conversion - channel # 5	
Function	**Description**
Read	Actual value after AD conversion of signal IN5 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y56: Actual value of AD conversion - channel # 6	
Function	**Description**
Read	Actual value after AD conversion of signal IN6 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y57: Actual value of AD conversion - channel # 7	
Function	**Description**
Read	Actual value after AD conversion of signal IN7 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y58: Actual value of AD conversion - channel # 8	
Function	**Description**
Read	Actual value after AD conversion of signal IN8 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 63y61: Configuration of AD channel # 1	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Comment:
Through a configuration (input configuration), the following parameters can be specified:

Input Configuration		
		Register Value
Single-ended	-20 .. +20 mA	3
	4 .. 20 mA	17
	-10 .. +10 V	8
Differential mode	-20 .. +20 mA	7
	4 .. 20 mA	21
	-10 .. +10 V	12

Register 63y62: Configuration of AD channel # 2	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y63: Configuration of AD channel # 3	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y64: Configuration of AD channel # 4	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y65: Configuration of AD channel # 5	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y66: Configuration of AD channel # 6	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y67: Configuration of AD channel # 7	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 63y68: Configuration of AD channel # 8	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

7.2.4 JX6-AD8 located in submodule socket # 1

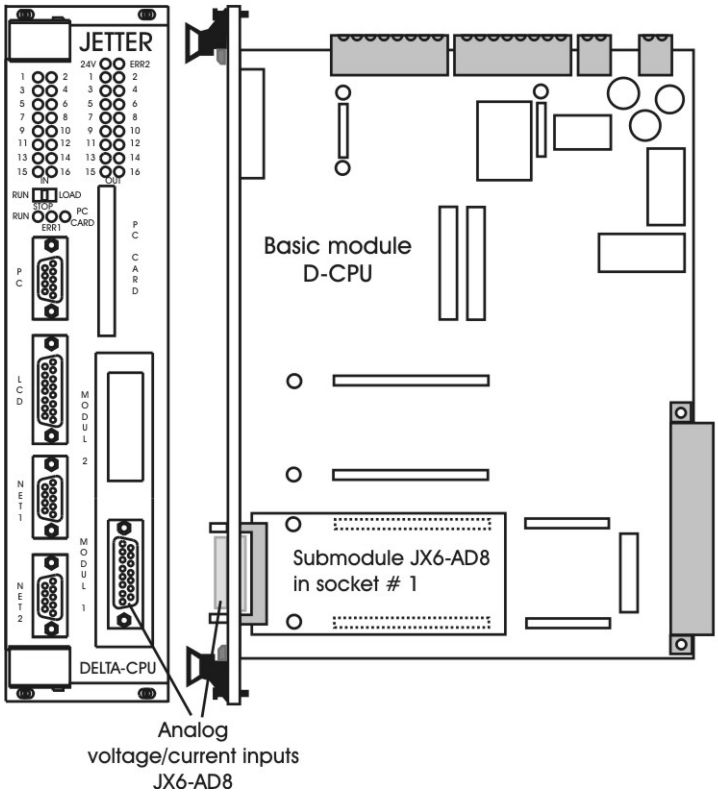


Fig. 15: Controller D-CPU, Submodule Socket # 1

Setting the submodule JX6-AD8

The submodule type has to be set once at the beginning of the program.

➢ Setting the submodule JX6-AD8

```
REGISTER_LOAD (61688, 3)
```

Initialization

This initialisation routine is required once at the beginning of the program.

➢ Initializing the JX6-AD8

```
REGISTER_LOAD (63305, 1)
```

➢ Configuration of Analog Inputs

Example: Configuration of AD channel # 1
; As differential voltage: -10 V ... +10 V
```
REGISTER_LOAD (63361, 12)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 1 after AD conversion

```
REGISTER_LOAD (rADValue, @63351)
```

7.2.5 JX6-AD8 located in submodule socket # 2

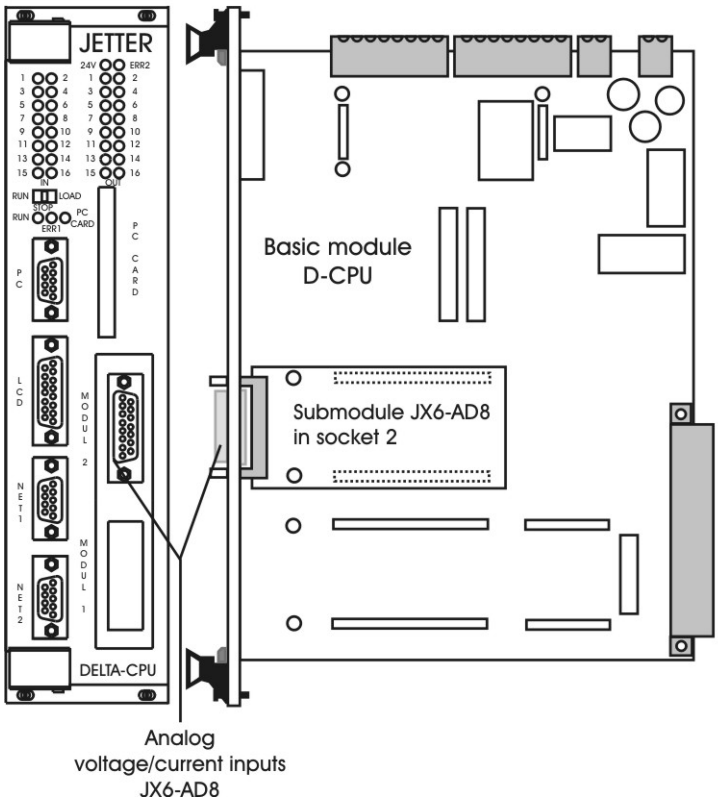


Fig. 16: Controller D-CPU, Submodule Socket # 2

Setting the submodule JX6-AD8

The submodule type has to be set once at the beginning of the program.

➢ Setting the submodule JX6-AD8
```
REGISTER_LOAD (61689, 3)
```

Initialization

This initialisation routine is required once at the beginning of the program.

➢ Initializing the JX6-AD8
```
REGISTER_LOAD (63405, 1)
```

➢ Configuration of Analog Inputs

Example: Configuration of AD channel # 2
; As differential voltage: -10 V ... +10 V
```
REGISTER_LOAD (63462, 12)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 2 after AD conversion

```
REGISTER_LOAD (rADValue, @63452)
```

7.3 JX6-AD8 plugged into a peripheral module JX6-CON1, or JX6-CON+

7.3.1 Addressing the submodule socket and the registers

Description of the register pattern: 1xyzzz

By way of example **`REG 1xyzzz`** it will be demonstrated, how the registers are numbered.

- The registers are addressed with the help of a 6 digit number.
- The first digit is always **`1.`**
- The second digit **x** specifies the **slot** where the peripheral module JX6-CON1, or JX6-CON+ is located.+
  x = Module slot (2 ... 8).
- The third digit **y** specifies the **submodule socket** where the JX6-AD8 submodule is located.
  y = Submodule socket (1 ... 3).
- The digits four, five and six `zzz` specifiy the actual register number with the letters `zzz` corresponding to the register numbers from **`0 to 999.`**

7.3.2 Overview of Registers

*) R/W: Read/Write; Ro: Read only

Reg. #	Type of register	R/W Ro*)
1xy051	Actual value of AD conversion - channel # 1	Ro
1xy052	Actual value of AD conversion - channel # 2	Ro
1xy053	Actual value of AD conversion - channel # 3	Ro
1xy054	Actual value of AD conversion - channel # 4	Ro
1xy055	Actual value of AD conversion - channel # 5	Ro

Reg. #	Type of register	R/W Ro*)
1xy056	Actual value of AD conversion - channel # 6	Ro
1xy057	Actual value of AD conversion - channel # 7	Ro
1xy058	Actual value of AD conversion - channel # 8	Ro
1xy061	Configuration of analog channel # 1	R/W
1xy062	Configuration of analog channel # 2	R/W
1xy063	Configuration of analog channel # 3	R/W
1xy064	Configuration of analog channel # 4	R/W
1xy065	Configuration of analog channel # 5	R/W
1xy066	Configuration of analog channel # 6	R/W
1xy067	Configuration of analog channel # 7	R/W
1xy068	Configuration of analog channel # 8	R/W
1xy151	Averaging ON / OFF - Analog channel # 1	R/W
1xy152	Averaging ON / OFF - Analog channel # 2	R/W
1xy153	Averaging ON / OFF - Analog channel # 3	R/W
1xy154	Averaging ON / OFF - Analog channel # 4	R/W
1xy155	Averaging ON / OFF - Analog channel # 5	R/W
1xy156	Averaging ON / OFF - Analog channel # 6	R/W
1xy157	Averaging ON / OFF - Analog channel # 7	R/W
1xy158	Averaging ON / OFF - Analog channel # 8	R/W
1xy199	Detected submodule type	Ro
1xy159	Selecting the analog channels to be converted	R/W
1xy173	Sampling interval per AD channel	R/W

7.3.3 Description of Registers

For each register, the following information will be given:

1. Function of the register resulting from a “reading access”, i.e. an instruction of the following kind: **`REGISTER_LOAD (220, @1xy056).`**
2. Function of the register resulting from a “write access”, i.e. an instruction of the following kind: **`REGISTER_LOAD (1xy068, @120).`**
3. Value range, i.e. valid numerical values for the registers.
4. Value of the register shortly after switching on the controller (or following RESET).
5. An example regarding the use of the register with a description of the effect resulting from the given instruction.

Register 1xy051: Actual value of AD conversion - channel # 1	
Function	**Description**
Read	Actual value after AD conversion of signal IN1 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Example:

Querying and processing the actual value of channel # 1 after AD conversion.
The AD conversion is continuously carried out in the background regardless whether the actual value is read-out.
The measured voltage ranging between -10 V and +10 V is converted into a digital value with a resolution of 16 Bit (65536). The value range is between -32768 and +32767. One digit, i.e. the least voltage difference subject to conversion, is approx. 0.3 mV.
The JX6-AD8 submodule is plugged into a JX6-CON1, or JX6-CON+ module
The JX6-CON1, or JX6-CON+ module is plugged into slot # 2 of the JX6-Basis-x rack.

```
THEN
  REGISTER_LOAD (rADValue, @121051)
```

Register 1xy052: Actual value of AD conversion - channel # 2	
Function	**Description**
Read	Actual value after AD conversion of signal IN2 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy053: Actual value of AD conversion - channel # 3	
Function	**Description**
Read	Actual value after AD conversion of signal IN3 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy054: Actual value of AD conversion - channel # 4	
Function	**Description**
Read	Actual value after AD conversion of signal IN4 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy055: Actual value of AD conversion - channel # 5	
Function	**Description**
Read	Actual value after AD conversion of signal IN5 or (IN1A - IN1B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy056: Actual value of AD conversion - channel # 6	
Function	**Description**
Read	Actual value after AD conversion of signal IN6 or (IN2A - IN2B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy057: Actual value of AD conversion - channel # 7	
Function	**Description**
Read	Actual value after AD conversion of signal IN7 or (IN3A - IN3B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy058: Actual value of AD conversion - channel # 8	
Function	**Description**
Read	Actual value after AD conversion of signal IN8 or (IN4A – IN4B)
Write	Illegal
Value range	-32768 ... +32767
Value after reset	0

Register 1xy061:Configuration of AD channel # 1	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Comment:
Through a configuration (input configuration), the following parameters can be specified:

Input Configuration		
		Register Value
Single-ended	-20 .. +20 mA	3
	4 .. 20 mA	17
	-10 .. +10 V	8
Differential mode	-20 .. +20 mA	7
	4 .. 20 mA	21
	-10 .. +10 V	12

Register 1xy062: Configuration of AD channel # 2	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy063: Configuration of AD channel # 3	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy064: Configuration of AD channel # 4	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy065: Configuration of AD channel # 5	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy066: Configuration of AD channel # 6	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy067: Configuration of AD channel # 7	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy068: Configuration of AD channel # 8	
Function	**Description**
Read	Present configuration
Write	New configuration
Value range	3, 7, 8, 12, 17, 21
Value after reset	8

Register 1xy151: Averaging ON/OFF – AD channel # 1	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Comment: (The explanation refers to AD channel # 1)
In this register the number of analogue values to be averaged is specified.
The averaged value is contained in register 1xy051.

Example 1: Averaging a range of 255 values.

```
THEN
  REGISTER_LOAD (121151, 255)
```

Example 2: Averaging OFF - AD channel # 1

```
THEN
  REGISTER_LOAD (121151, 0)
```

Register 1x152: Averaging ON/OFF – AD channel # 2	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy153: Averaging ON/OFF – AD channel # 3	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy154: Averaging ON/OFF – AD channel # 4	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy155: Averaging ON/OFF – AD channel # 5	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy156: Averaging ON/OFF – AD channel # 6	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy157: Averaging ON/OFF – AD channel # 7	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy158: Averaging ON/OFF – AD channel # 8	
Function	**Description**
Read	Present number of input values to be averaged.
Write	New number of input values to be averaged.
Value range	0 ... 32767
Value after reset	0 (averaging deactivated)

Register 1xy159: Selecting the analog channels to be converted	
Function	**Description**
Read	Selected analog channels
Write	Selecting the analog channels to be converted
Value range	1 ... 255 (bit-coded)
Value after reset	255 (all eight channels have been selected for AD conversion)

Comment:

Bit 0:	Selecting analog channel # 1	1 =	Analog channel # 1 has been selected for AD conversion
		0 =	Analog channel # 1 has not been selected for AD conversion
Bit 1:	Selecting analog channel # 2	1 =	Analog channel # 2 has been selected for AD conversion
		0 =	Analog channel # 2 has not been selected for AD conversion
Bit 2:	Selecting analog channel # 3	1 =	Analog channel # 3 has been selected for AD conversion
		0 =	Analog channel # 3 has not been selected for AD conversion
Bit 3:	Selecting analog channel # 4	1 =	Analog channel # 4 has been selected for AD conversion
		0 =	Analog channel # 4 has not been selected for AD conversion
Bit 4:	Selecting analog channel # 5	1 =	Analog channel # 5 has been selected for AD conversion
		0 =	Analog channel # 5 has not been selected for AD conversion
Bit 5:	Selecting analog channel # 6	1 =	Analog channel # 6 has been selected for AD conversion
		0 =	Analog channel # 6 has not been selected for AD conversion
Bit 6:	Selecting analog channel # 7	1 =	Analog channel # 7 has been selected for AD conversion
		0 =	Analog channel # 7 has not been selected for AD conversion

Bit 7	Selecting analog channel # 8	1 =	Analog channel # 8 has been selected for AD conversion
		0 =	Analog channel # 8 has not been selected for AD conversion

Important !

At least, one analog channel shall be selected.

Note!

These bits can be queried, set or reset in a simple way using the **BIT_SET** and **BIT_CLEAR** instructions.

Example 1:

- The JX6-AD8 is plugged into submodule socket # 3 of the JX6-CON1 module.
- The JX6-CON1 module is plugged into slot # 2 of the JX6-Basis-4 rack.

The voltage (current) of analog channel # 3 is cyclically to be converted into a digital value
The following program segment sets the corresponding bit in register 123159.

```
....
BIT_SET (123159, 2)
....
```

Example 2:

- The JX6-AD8 is plugged into submodule socket # 1 of the JX6-CON1 module.
- The JX6-CON1 module is plugged into slot # 2 of the JX6-Basis-4 rack.

All eight channels are selected for AD conversion by means of an instruction.

```
....
REGISTER_LOAD (121159, 255)
....
```

Register 1xy173: Sampling interval per AD channel	
Function	**Description**
Read	Sampling interval per AD channel
Write	New sampling interval per AD channel
Value range	1 ... 5
Value after reset	5

Comment:

Register Value	Sampling interval in milliseconds
1	1
2	2
3	4
4	8
5	16

Register 1xy199: Detected submodule type	
Function	**Description**
Read	Type of plugged submodule
Write	Illegal
Value range	1 ... 7
Value after reset	Type of plugged submodule

Register Value	Submodule Type
1	SV_MODULE_TYPE
2	AD8_MODULE_TYPE
3	DIMA3_MODULE_TYPE
4	SM_MODULE_TYPE
5	DA4_MODULE_TYPE
7	INTELLIGENT_MODULE_TYPE

7.3.4 JX6-AD8 located in submodule socket # 1

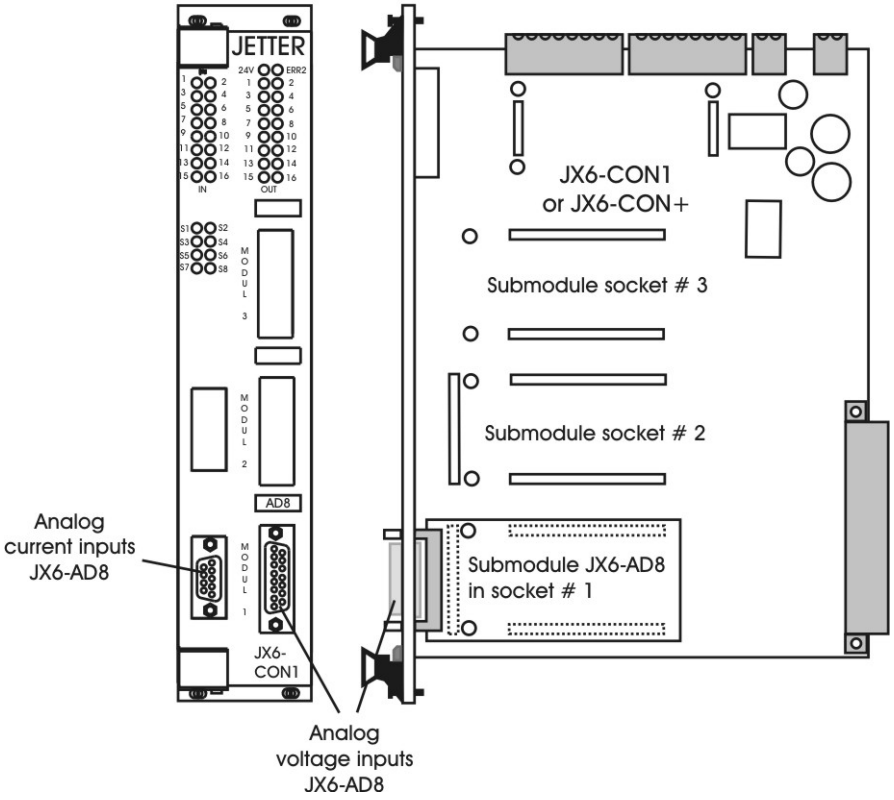


Fig. 17: Peripheral Module JX6-CON1, Submodule Socket # 1

Initialization

Example:

- The JX6-AD8 is plugged into submodule socket # 1 of the JX6-CON1 module.
- The JX6-CON1 module is plugged into slot # 3 of the JX6-Basis-4 rack.

This initialization routine is required once at the beginning of the program.

➢ Configuration of analog inputs

Example: Configuration of AD channel # 1
; As differential voltage -10 V ... +10 V
```
REGISTER_LOAD (131061, 12)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 1 after AD conversion

```
REGISTER_LOAD (rADValue, @131051)
```

Note!

Once the analog inputs have been configured, the OS software of the peripheral module JX6-CON1, or JX6-CON+ provides an continuous AD conversion.
As soon as an AD conversion is completed, the next AD conversion is started immediately.

7.3.5 JX6-AD8 located in submodule socket # 2

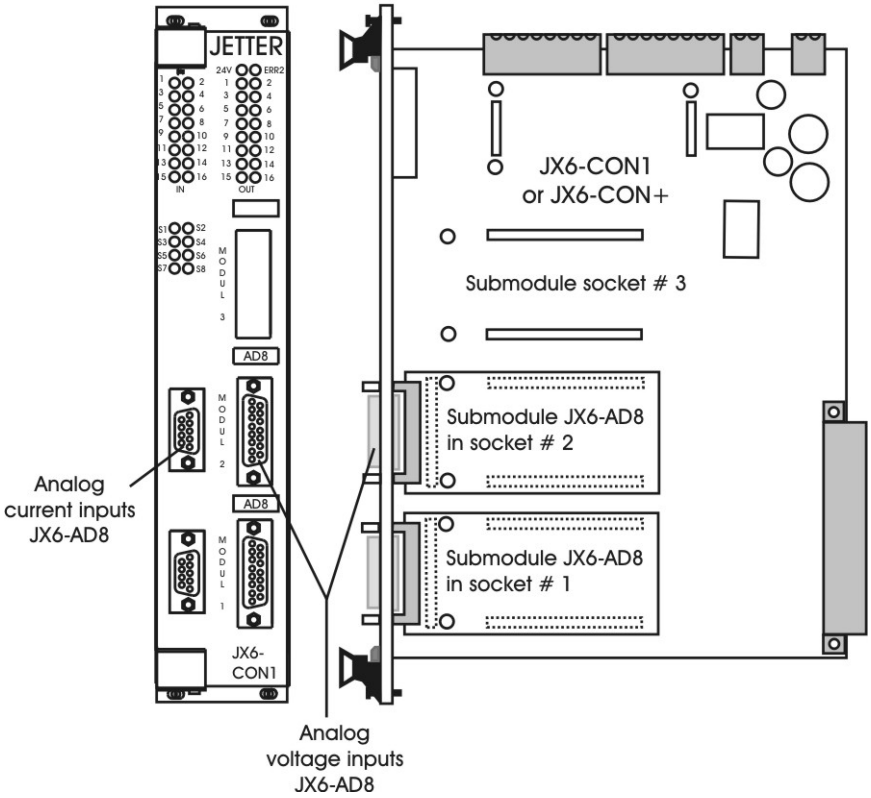


Fig. 18: Peripheral Module JX6-CON1, Submodule Socket # 2

Initialization

Example:
- The JX6-AD8 is plugged into submodule socket # 2 of the JX6-CON1 module.
- The JX6-CON1 module is plugged into slot # 3 of the JX6-Basis-4 rack.

This initialization routine is required once at the beginning of the program.

➢ Configuration of analog inputs

Example: Configuration of AD channel # 1

```
; Current, single-ended     4 ... 20 mA
REGISTER_LOAD (132061, 17)
```

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 1 after AD conversion

```
REGISTER_LOAD (rADValue, @132051)
```

Note!

Once the analog inputs have been configured, the OS software of the peripheral module JX6-CON1, or JX6-CON+ provides an continuous AD conversion.
As soon as an AD conversion is completed, the next AD conversion is started immediately.

7.3.6 JX6-AD8 located in submodule socket # 3

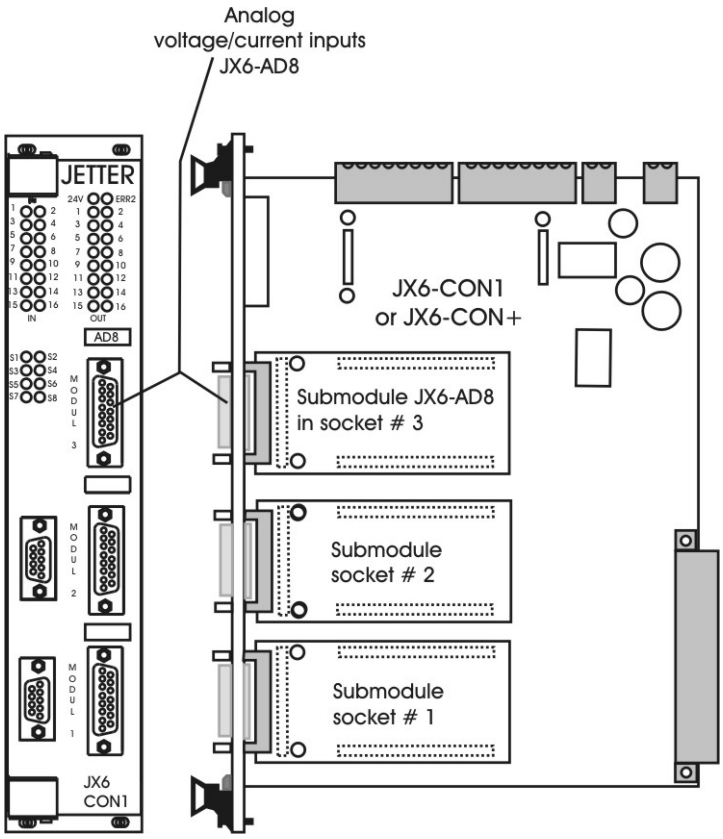


Fig. 19: Peripheral Module JX6-CON1, Submodule Socket # 3

Initialization

Example:

- The JX6-AD8 is plugged into submodule socket # 3 of the JX6-CON1 module.
- The JX6-CON1 module is plugged into slot # 4 of the JX6-Basis-4 rack.

This initialization routine is required once at the beginning of the program.

➢ Configuration of analog inputs

Example: Configuration of AD channel # 1
As differential voltage -10 V ... +10 V
`REGISTER_LOAD (143061, 12)`

Reading out the actual value after AD conversion

➢ Reading out and processing the actual value after AD conversion

Example: Reading out the actual value of channel # 1 after AD conversion

```
REGISTER_LOAD (rADValue, @143051)
```

Note!

Once the analog inputs have been configured, the OS software of the peripheral module JX6-CON1, or JX6-CON+ provides an continuous AD conversion.
As soon as an AD conversion is completed, the next AD conversion is started immediately.

8 Installing the JX6-AD8 Submodule

This installing procedure is to be perfomed in case you want to

- reset jumpers on the JetWeb Submodule JX6-AD8
- plug the JetWeb Submodule JX6-AD8 into a different socket of the basic module.

Procedure:

➢ Switch off the power supply.

➢ Disconnect the 2-pin terminal (1) of the power supply for the basic module (refer to Fig. 20).

➢ Disconnect the two 8-pin terminals (2) of the 16 digital inputs located on the basic module (refer to Fig. 20)

➢ If applicable:
Remove the 2-pin terminal (3) of the external voltage supply of the outputs and the two 8-pin terminals (3) of the 16 digital outputs, or the two 8-pin terminal blocks (4) of the digital inputs 33 to 48 (refer to Fig. 20).

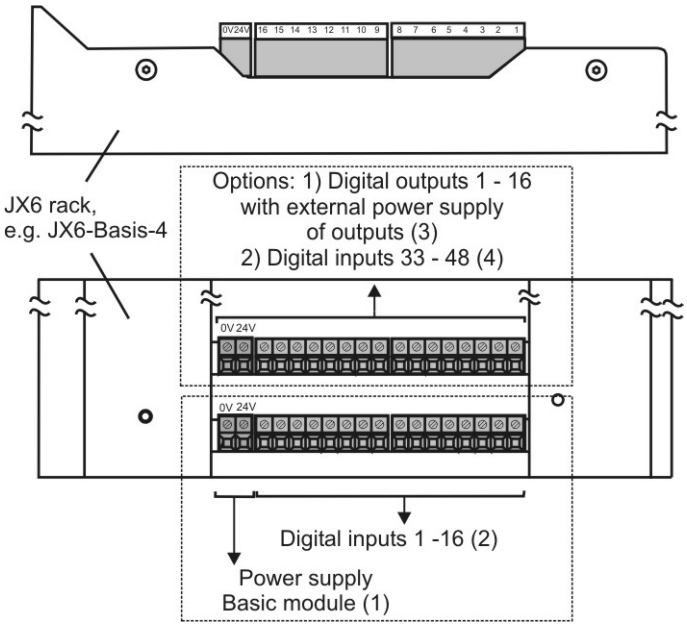


Fig. 20: Top and Side Views of the JX6 Rack

- Use a screwdriver to loosen the four screws (6) connecting the basic module with the JX6 rack (refer to Fig. 21).

- Unscrew all hexagon screws (5) from the front panel of the basic module.
  The female SUB-D connectors are attached with these screws to the front panel (refer to Fig. 21).
  For this job use a socket wrench 4.5.

- Pull the basic module out of the JX6 rack using the two handles (6) (refer to Fig. 21).

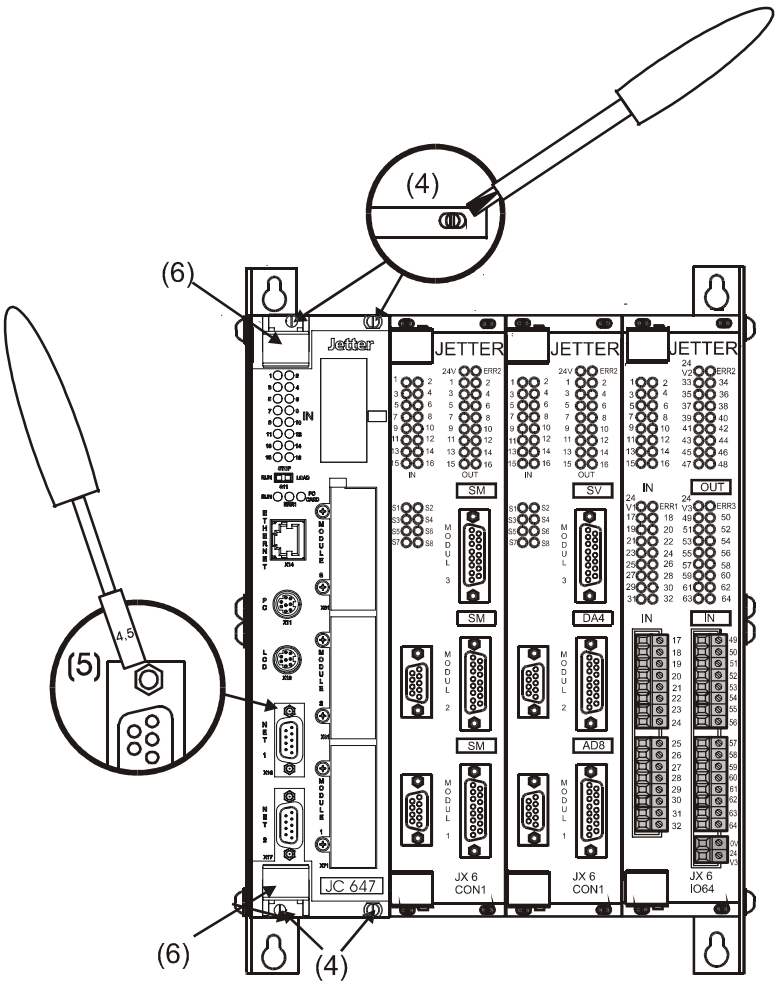


Fig. 21: Front View of the JX6 Rack with Basic Modules

➢ Detach the front panel from the PCB. To do so, unscrew both screws (7) with a screwdriver (refer to Fig. 22).

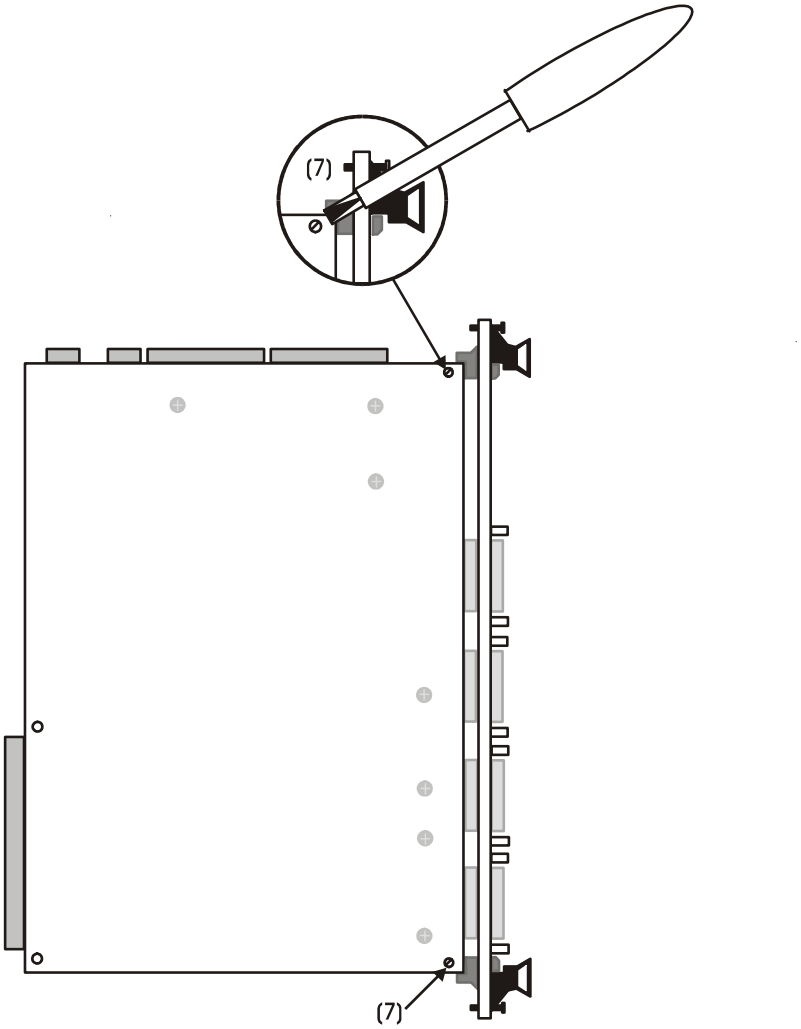


Fig. 22: View on the solder side of the basic module

➢ The submodule is electrically connected to the basic module with the help of two or three connectors.
In addition to this, the submodule is attached to the basic module mechanically with two screws.

Unscrew both screws (8) using a Philips screwdriver (refer to Fig. 23).

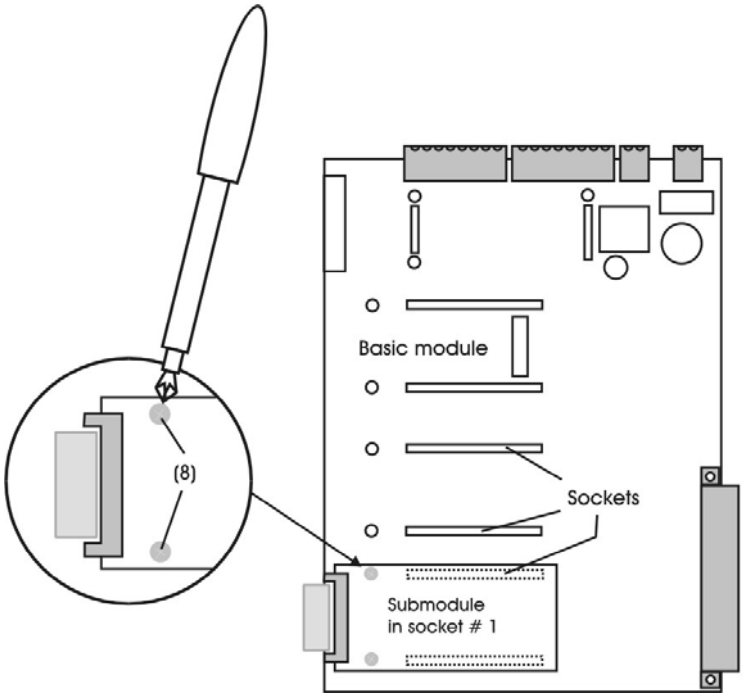


Fig. 23: Removing the submodule from the basic module

➢ Remove the submodule from the connectors.

Now, you can do the following:
- reset jumpers on the JetWeb Submodule JX6-AD8
- plug the JetWeb Submodule JX6-AD8 into a different socket of the basic module.

Jumper Settings

➢ For more information refer to chapter 6.1.3. Reset the jumpers and follow the above mentioned procedure in reverse order.

Inserting the submodule into a different submodule socket

➢ Insert the submodule into a different submodule socket and follow the above mentioned procedure in reverse order.

Note!

Before you screw the front panel to the PCB, you must possibly remove the corresponding blanking plate covering the front plate opening in front of the submodule socket or screw it to a different place.
For this job use a socket wrench 5.5.

Appendix

Appendix A: Glossary

Sampling interval	An ADC requires a certain time, i.e. the sampling interval, to convert an analogue value to a digital value.
Analog	A parameter, e.g. voltage, which is steplessly adjustable. Contrast to digital.
Digital	Binary presentation of a parameter, e.g. time. This parameter in digital representation can be changed in given steps only, that is in binary mode. Contrast to analog.
Electro-Magnetic Compatibility	Definition according to EMC regulations: "EMC is the ability of a device to function in a satisfactory way in electro-magnetic surroundings without causing electromagnetic disturbances itself, which would be unbearable for other devices in these surroundings."
Impedance	Impedance consists of the ohmic resistance and the reactance. The ohmic resistance is independent of the frequency. The ohmic resistance is proportionally dependent of the frequency.
“Low Voltage Directive"	To be considered when using electric devices of a rated voltage between 50 and 1000 V AC and between 75 and 1500 V DC.
Registers	A high-speed memory for a group of bits placed in a microprocessor or in another electronic device where data can be buffered for a specific purpose. On JETTER controllers, usually, these are 24 bit wide storage positions in a remanent RAM.
Resolution	For D/A or A/D conversion: The resolution may be expressed as the number of bits in the digital value that corresponds to a full-scale

	analogue value. For example, the analogue range may be a voltage between -10 V and +10 V or a current range between 0 and 20 mA.
Ripple - Smoothing - Filtering	Ripple: The percentage of AC left on a DC signal after rectifying. Filtering: Circuit configuration with a RC or LC component in order to achieve more smoothness or a lower ripple of the DC voltage.
Vibration resistance	The device can permanently or shockwise be exposed to a vibration defined in the standard.

Appendix B: List of Abbreviations

AC	**A**lternating **C**urrent
CAN	**C**ontroller **A**rea **N**etwork
CE	**C**ommunautés **E**uropéennes **E**uropean **C**ommunities
DC	**D**irect **C**urrent
EMC	**E**lectro-**M**agnetic **C**ompatibility
EN	European Standard
Gnd	**G**rou**nd**
IEC	International Electrotechnical Commission
PE	**P**rotected **E**arth
SELV	**S**afe **E**xtra **L**ow **V**oltage: Voltage up to 60 V, galvanically separated from the network.
SUB-D	Type name of a plug-in connector

Appendix C: Index of Illustrations

Appendix D: Index