MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6ES7461-3AA00-0AA0

IM 461-3 RECEIVE INTERFACE MODULE

Used with the applicable SIMATIC S7-400 configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens product data sheet, 6ES7461-3AA00-0AA0

Interface Modules

6

Chapter Overview

Section	Description	Page
6.1	Common Features of the Interface Modules	6-2
6.2	The Interface Modules IM 460-0; (6ES7460-0AA00-0AB0, 6ES7460-0AA01-0AB0) and IM 461-0; (6ES7461-0AA00-0AA0, 6ES7461-0AA01-0AA0)	6-7
6.3	The Interface Modules IM 460-1; (6ES7460-1BA00-0AB0, 6ES7460-1BA01-0AB0) and IM 461-1; (6ES7461-1BA00-0AA0, 6ES7461-1BA01-0AA0)	6-10
6.4	The Interface Modules IM 460-3; (6ES7460-3AA00-0AB0, 6ES7460-3AA01-0AB0) and IM 461-3; (6ES7461-3AA00-0AA0, 6ES7461-3AA01-0AA0)	6-14
6.5	The Interface Modules IM 460-4; (6ES7460-4AA01-0AB0, IM 461-4; (6ES7461-4AA01-0AA0)	6-18

You will find a description of the IM 463-2 in Chapter 7.

6.1 Common Features of the Interface Modules

Function

Interface modules (a send IM and a receive IM) are required if one or more expansion units (EU) are to be connected to a central controller (CC). This configuration is described in the *Installation Manual,* Chapter 4.

Configuration

Interface modules must always be used together. The send modules (send IMs) are inserted in the CC, whilst the corresponding receive modules (receive IMs) are plugged into the series-connected EU.

Table 6-1 Interface Modules of the S7-400

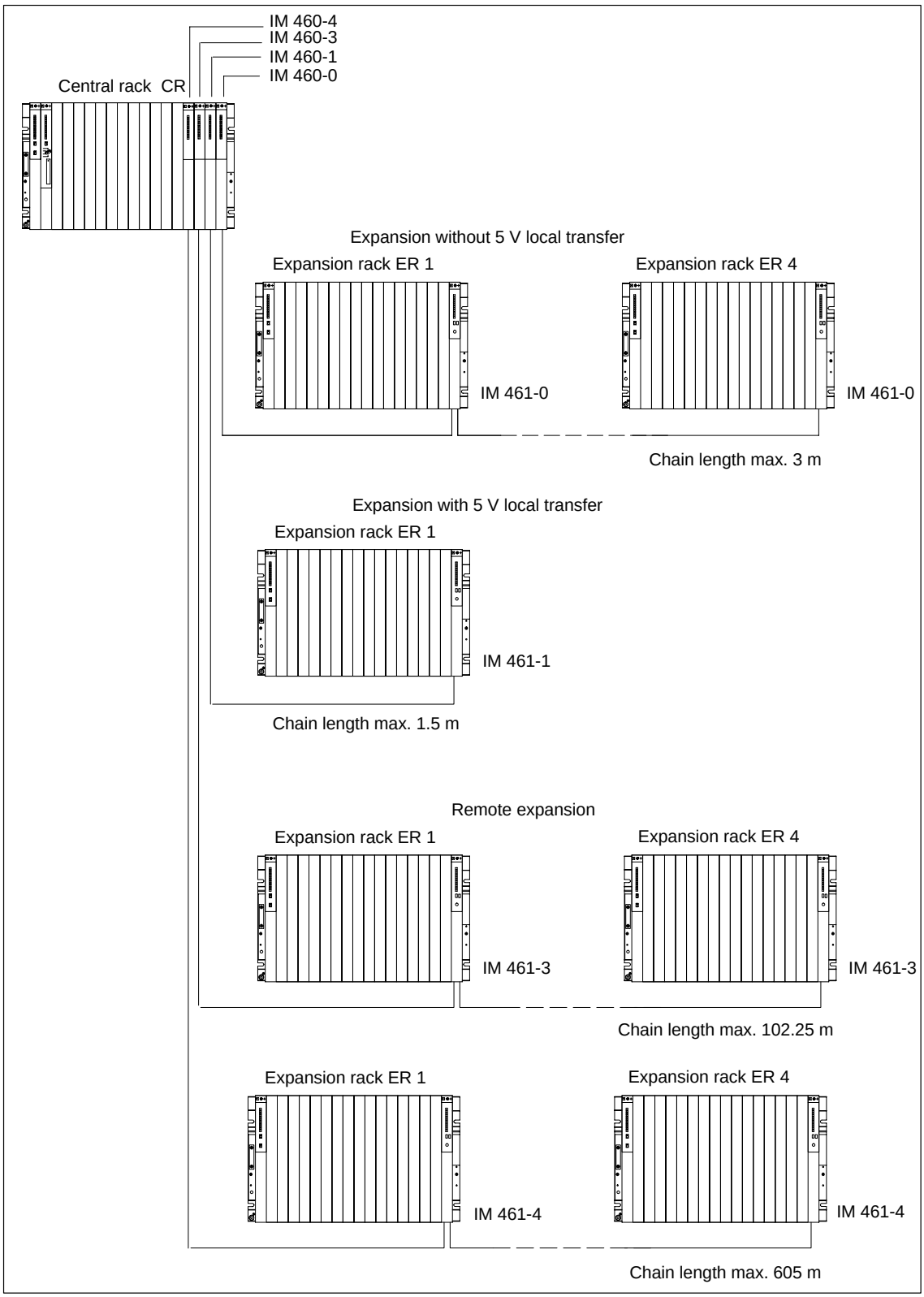
Partner	Areas of Application
IM 460-0	Send IM for local link without PS transfer; with communication bus
IM 461-0	Receive IM for local link without PS transfer; with communication bus
IM 460-1	Send IM for local link with PS transfer; without communication bus
IM 461-1	Receive IM for local link with PS transfer; without communication bus
IM 460-3	Send IM for remote link up to 102 m; with communication bus
IM 461-3	Receive IM for remote link up to 102 m; with communication bus
IM 460-4	Send IM for remote link up to 605 m; without communication bus
IM 461-4	Receive IM for remote link up to 605 m; without communication bus

Overview of the Properties of the Connections

Note the rules for connections in the section after next.

	Local connection		Remote connection	
Send IM	460-0	460-1	460-3	460-4
Receive IM	461-0	461-1	461-3	461-4
Max. number of connectable EMs per chain	4	1	4	4
Max. distance	3 m	1.5 m	102.25 m	605 m
5 V transfer	No	Yes	No	No
Max. current transfer per interface	–	5 A	–	–
Communication bus transmission	Yes	No	Yes	No

Connection possibilities for central racks and expansion racks



Rules for Connection

When you connect a central rack to expansion racks, you must observe the following rules:

- You can connect up to 21 ERs of the S7-400 to one CR.
- The ERs are assigned numbers to identify them. The rack number must be set on the coding switch of the receive IM. Any rack number between 1 and 21 may be assigned. Numbers must not be duplicated.
- You may insert up to six send IMs in one CR. However, only two send IMs with 5 V transfer are allowed in one CR.
- Each chain connected to the interface of a send IM can comprise up to four ERs (without 5 V transfer) or one ER (with 5 V transfer).
- The exchange of data via the communication bus is limited to 7 racks, meaning the CR and ER numbers 1 to 6.
- The maximum (total) cable lengths specified for the type of connection must not be exceeded.

Connection type	Maximum (total) line length
Local connection with 5 V transfer via IM 460-1 and IM 461-1	1.5 m
Local connection without 5 V transfer via IM 460-0 and IM 461-0	3 m
Remote connection via IM 460-3 and IM 461-3	102.25 m
Remote connection via IM 460-4 and IM 461-4	605 m

Terminator

The bus must be terminated in the last EU of a line. To do this, plug in the appropriate terminator in the lower front connector of the receive IM in the last EU of the line. Unused front connectors in a send IM do not have to be terminated. The IM 461-1 with the order number 6ES7 461-1BA01-0AA0 does not require a terminator.

Table 6-2 Terminators for the Receive IMs

Receive IM	Terminator
IM 461-0	6ES7461-0AA00-7AA0
IM 461-1	6ES7461-1BA00-7AA0
IM 461-3	6ES7461-3AA00-7AA0
IM 461-4	6ES7461-4AA00-7AA0

The following figure shows you a typical configuration with send IMs, receive IMs and terminators.

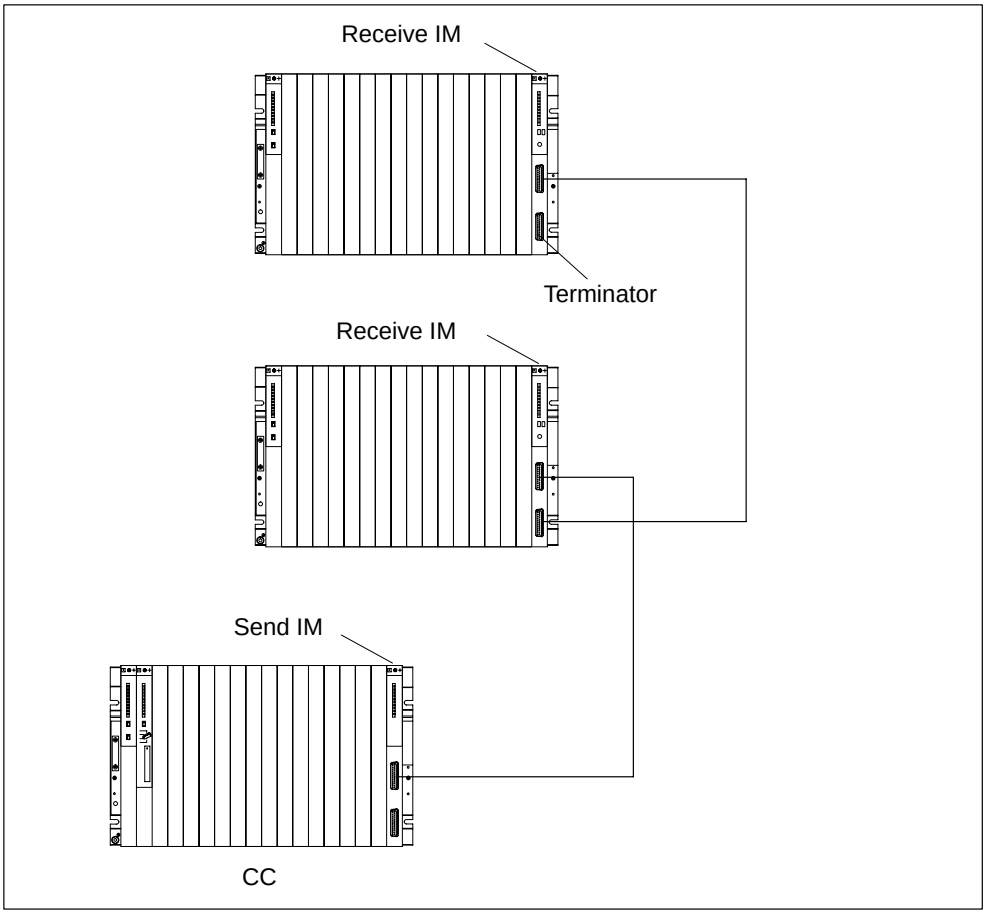


Figure 6-1 Example: Configuration with Send IMs, Receive IMs and Terminators

Connecting Cable

Precut cables are available in different fixed lengths for connecting the individual interface modules. (See Appendix C: Accessories and Spare Parts)

Table 6-3 Connecting Cable for Interface Modules

Interface Modules	Connecting Cable
IM 460-0 and IM 461-0 IM 460-3 and IM 461-3	6ES7468-1... (P bus and communication bus are transferred)
IM 460-1 and IM 461-1	6ES7468-3... (P bus is transferred; mounting rack is supplied with current via the IM)
IM 460-4 and IM 461-4	6ES7468-1...

Installation and Removal of the Modules During Operation

Please read the following warning on the insertion and removal of the interface modules and associated connecting cables.

Caution

Data may be lost or corrupted.

Removing or inserting the interface modules and/or their associated connecting cables under voltage can result in the loss or corruption of data.

Switch off the power supply modules to the CC and EUs you are working on before you carry out any changes.

Feeding in External Backup Voltage to the “EXT.-BATT.” Socket (Not Possible in Modules as of Order Number -0AA01-)

When changing the battery in the power supply modules of the S7-400, you can ensure uninterruptible backup in the CC if you apply between 5 VDC and 15 VDC to the “EXT.-BATT.” socket of the CPU. This only provides backup power to the CC.

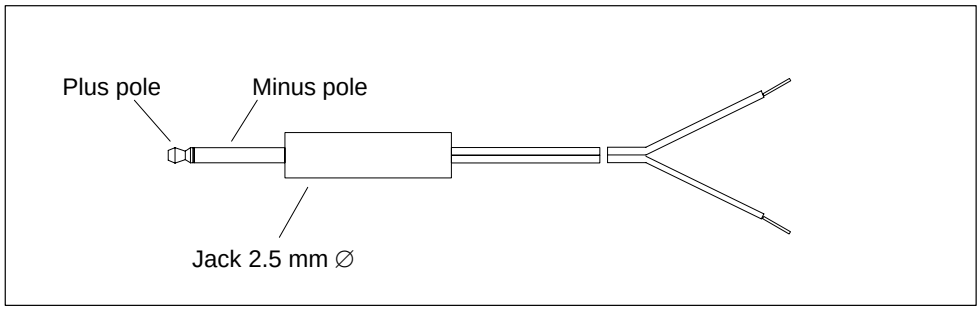
You can achieve corresponding backup in an EU in the case of the following receive IMs by applying between 5 VDC and 15 VDC to the “EXT.-BATT.” socket.

- IM 461-0 6ES7461-0AA00-0AA0
- IM 461-1 6ES7461-1BA00-0AA0
- IM 461-3 6ES7461-3AA00-0AA0

The “EXT.-BATT.” input has the following features:

- Reverse polarity protection
- A short-circuit current limit of 20 mA

To provide an incoming supply at the “EXT.-BATT” socket, you need a connecting cable with a 2.5 mm ∅ jack, as illustrated in the following figure. Note the polarity of the jack.



6.2 The Interface Modules IM 460-0; (6ES7460-0AA00-0AB0, 6ES7460-0AA01-0AB0) and IM 461-0; (6ES7461-0AA00-0AA0, 6ES7461-0AA01-0AA0)

Position of the Operator Controls and Indicators of the IM 460-0 and IM 461-0

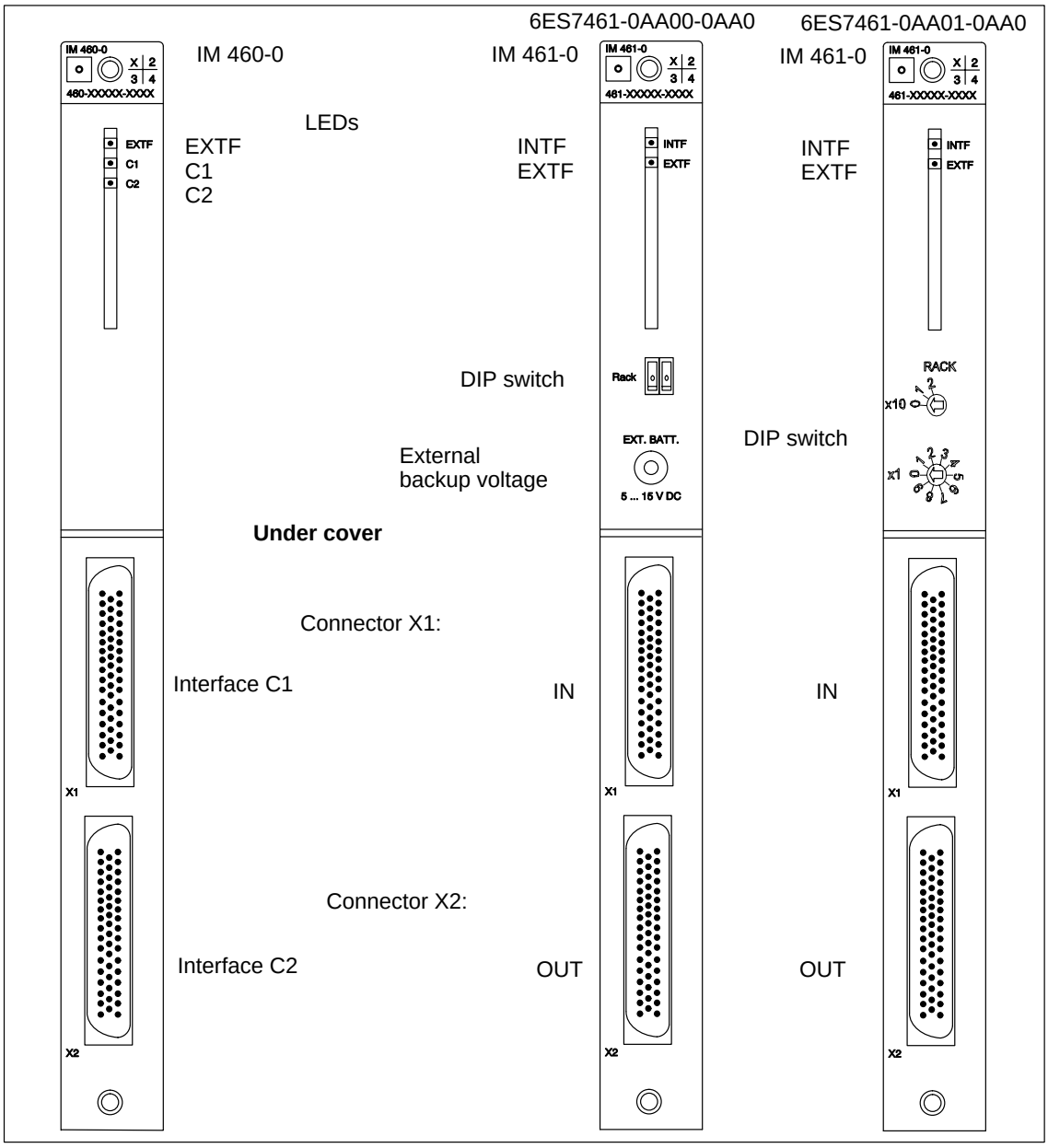


Figure 6-2 Position of the Operator Controls and Indicators of the IM 460-0 and IM 461-0

Function

The interface module pair IM 460-0 (send IM) and IM 461-0 (receive IM) are used for a local link. The communication bus is transferred at the full transmission rate.

Parameter Assignment for the Mounting Rack Number

Using the DIP switch on the front panel of the module, you must set the number of the mounting rack in which the receive IM is installed. The permitted range is 1 to 21.

Setting/Changing the Number

Proceed as follows:

1. Put the switch of the power supply module in the EU in which you want to make a change in the position ⏻ (Output voltage 0 V).
2. Enter the number using the DIP switch.
3. Switch the power supply module on again.

Operator Controls and Indicators on the Send IM

EXTF LED (red)	Lights up in the event of an external fault Line 1 or line 2 is faulty (terminator missing or broken cable)
C1 LED (green)	Line 1 (via front connector X1, connection 1) is correct.
C1 LED (flashing green)	An EU in the line is not ready for operation because • The power supply module is not switched on or • A module has not yet completed the initialization process
C2 LED (green)	Line 2 (via front connector X2, connection 2) is correct.
C2 LED (flashing green)	An EU in the line is not ready for operation because • The power supply module is not switched on or • A module has not yet completed the initialization process
Front connectors X1 and X2	Connector (output) for line 1 and line 2 X1 = upper front connector; X2 = lower front connector

Operator Controls and Indicators of the Receive IM

INTF LED (red)	Lights up if a rack number > 21 or = 0 was set. Lights up if you have changed the rack number under voltage.
EXTF LED (red)	Lights up in the event of an external fault (line fault, for example, if the terminator is not inserted or if a module has not yet completed the initialization process).
DIP switch	DIP switch to set the number of the mounting rack.
Socket for external backup voltage EXT.BATT.	On the IM 461-0 (order number 6ES7461-0AA00-0AA0) you can connect external backup voltage (5 V to 15 V) or central backup (see *Installation Manual*, Chapter 9) to this socket when you want to replace the mounting rack power supply. This will ensure backup of the corresponding EU without interruption. If you use this IM in a cabinet, you should, for reasons of space, use an angled connector for the incoming supply.
Front connector X1	Upper connector (input) for the connecting cable from the previous interface module.
Front connector X2	Lower connector (output) for the connecting cable to the next interface module or for the terminator.

Technical Specifications of the IM 460-0 and IM 461-0

Maximum line length (total)	3 m, 5 m in the IM 461-0 with the order number 6ES7461-0AA01-0AA0, in the IM 461-0 with the order number 6ES7461-0AA00-0AA0 as of version A4, in the IM 460-0 with the order number 6ES7460-1AA01-0AA0 and in the IM 460-0 with the order number 6ES7460-1AA00-0AA0 as of version A5
Dimensions W x H x D (mm)	25 x 290 x 280
Weight • IM 460-0 • IM 461-0	 600 g 610 g
Current consumption from the S7-400 bus 5 VDC • IM 460-0 • IM 461-0	 Typ. 130 mA Max. 140 mA Typ. 260 mA Max. 290 mA
Power loss • IM 460-0 • IM 461-0	 Typ. 650 mW Max. 700 mW Typ. 1300 mW Max. 1450 mW
Terminator	6ES7461-0AA00-7AA0
Backup current	No

6.3 The Interface Modules IM 460-1; (6ES7460-1BA00-0AB0, 6ES7460-1BA01-0AB0) and IM 461-1; (6ES7461-1BA00-0AA0, 6ES7461-1BA01-0AA0)

Position of the Operator Controls and Indicators of the IM 460-1 and IM 461-1

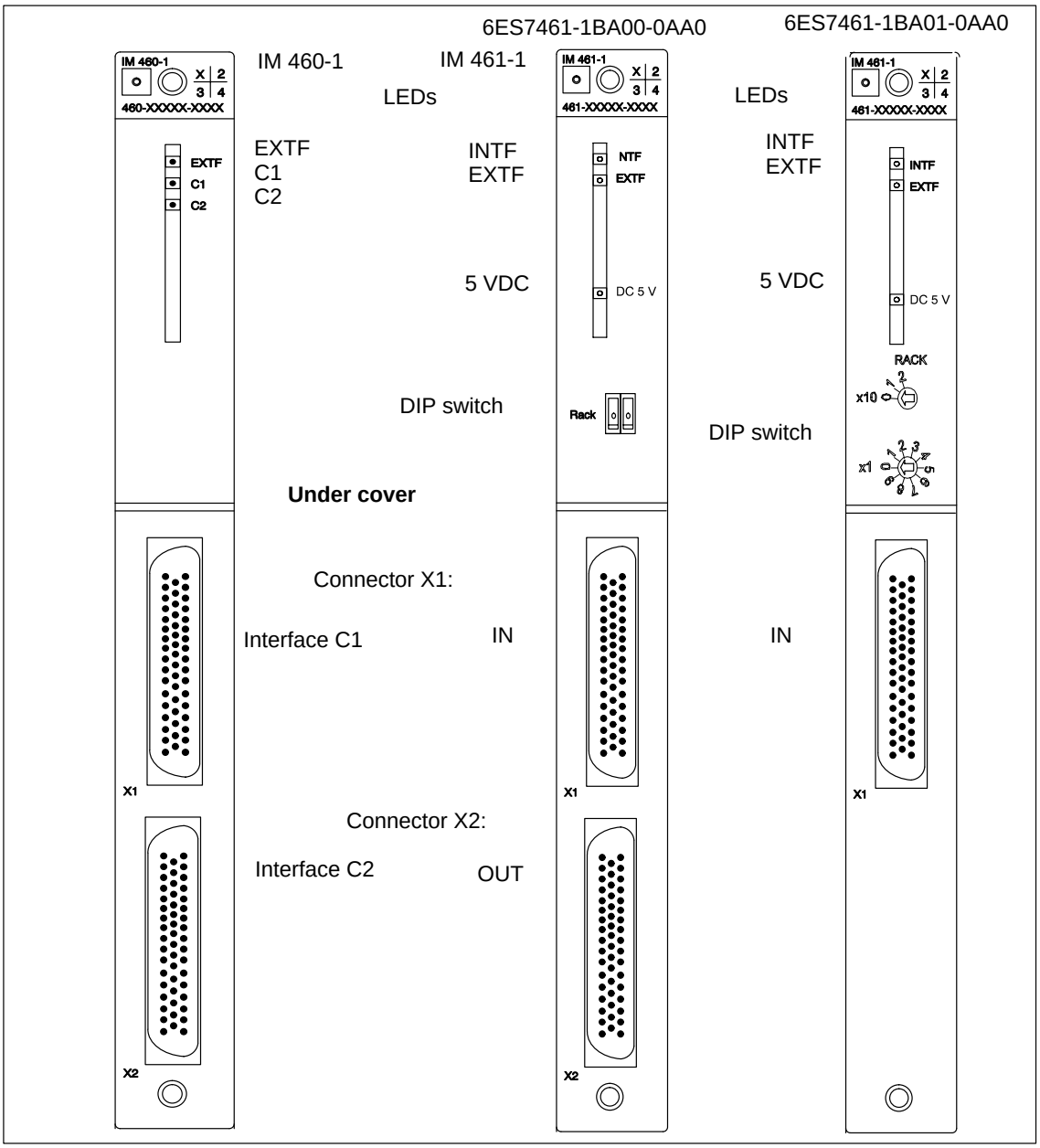


Figure 6-3 Position of the Operator Controls and Indicators of the IM 460-1 and IM 461-1

Function

The interface module pair IM 460-1 (send IM) and IM 461-1 (receive IM) are used for a local link (up to a maximum 1.5 m in total). A 5 V supply voltage is also transferred with these interface modules. Please particularly remember the following points:

- The current requirements of the module plugged into the EU must not exceed 5 V/5 A.
- You can only connect one EU per line.
- The modules in this mounting rack are not supplied with 24 V and are not backed up.
- The communication bus is not transferred with the interface module pair IM 460-1 and IM 461-1.
- You must not use a power supply module in the EU.

Note

If you connect an EU via a local link with 5 V transmission, ungrounded operation is prescribed for the EU (see *Installation Manual,* Chapter 4)

Parameter Assignment for the Mounting Rack Number

Using the DIP switch on the front panel of the module, you must set the number of the mounting rack in which the receive IM is installed. The permitted range is 1 to 21.

Setting/Changing the Number

Proceed as follows:

1. Put the power supply module in the CC into the position ⏻ (Output voltage 0 V).
2. Enter the number using the DIP switch.
3. Switch the power supply module on again.

Operator Controls and Indicators on the Send IM

EXTF LED (red)	Lights up in the event of an external fault Line 1 or line 2 is faulty (terminator missing or open circuit)
C1 LED (green)	Line 1 (via front connector X1, connection 1) is correct.
C1 LED (flashing green)	A module has not yet completed the initialization process
C2 LED (green)	Line 2 (via front connector X2, connection 2) is correct.
C2 LED (flashing green)	A module has not yet completed the initialization process
Front connectors X1 and X2	Connector (output) for line 1 and line 2 X1 = upper front connector; X2 = lower front connector

Operator Controls and Indicators of the Receive IM

INTF LED (red)	Lights up if a rack number > 21 or = 0 was set. Lights up if you have changed the rack number under voltage.
EXTF LED (red)	Lights up in the event of an external fault (line fault, for example, if the terminator is not inserted or if a module has not yet completed the initialization process, but not when the CC is switched off)
5 VDC (green)	Power supply in the EU is correct.
DIP switch	DIP switch to set the number of the mounting rack.
Front connector X1	Upper connector (input) for the connecting cable from the previous interface module.
Front connector X2	Lower connector (output) for terminator. The front connector X2 is no longer required for the IM 461-1 (order number 6ES7 461-1BA01-0AA0). The terminator (6ES7461-1BA00-7AA0) previously required is now integrated in the module.



Caution

Modules can be damaged.

If you want to connect an EU via the IM 461-1 interface module and use a power supply module in this EU, you might damage the modules.

Don’t use a power supply module in an EU that you want to connect to the CC via the IM 461-1 interface module.

Technical Specifications of the IM 460-1 and IM 461-1

Maximum line length (total)	1.5 m	
Dimensions W x H x D (mm)	25 x 290 x 280	
Weight • IM 460-1 • IM 461-1	 600 g 610 g	
Current consumption from the S7-400 bus 5 VDC • IM 460-1 • IM 461-1	 Typ. 50 mA Typ. 120 mA	 max. 85 mA max. 100 mA
Power loss • IM 460-1 • IM 461-1	 Typ. 250 mW Typ. 500 mW	 max. 425 mW max. 600 mW
Terminator	6ES7 461-1BA00-7AA0	
Power supply for EU	5 V/5 A per line	
Backup current	No	

6.4 The Interface Modules IM 460-3; (6ES7460-3AA00-0AB0, 6ES7460-3AA01-0AB0) and IM 461-3; (6ES7461-3AA00-0AA0, 6ES7461-3AA01-0AA0)

Position of the Operator Controls and Indicators of the IM 460-3 and IM 461-3

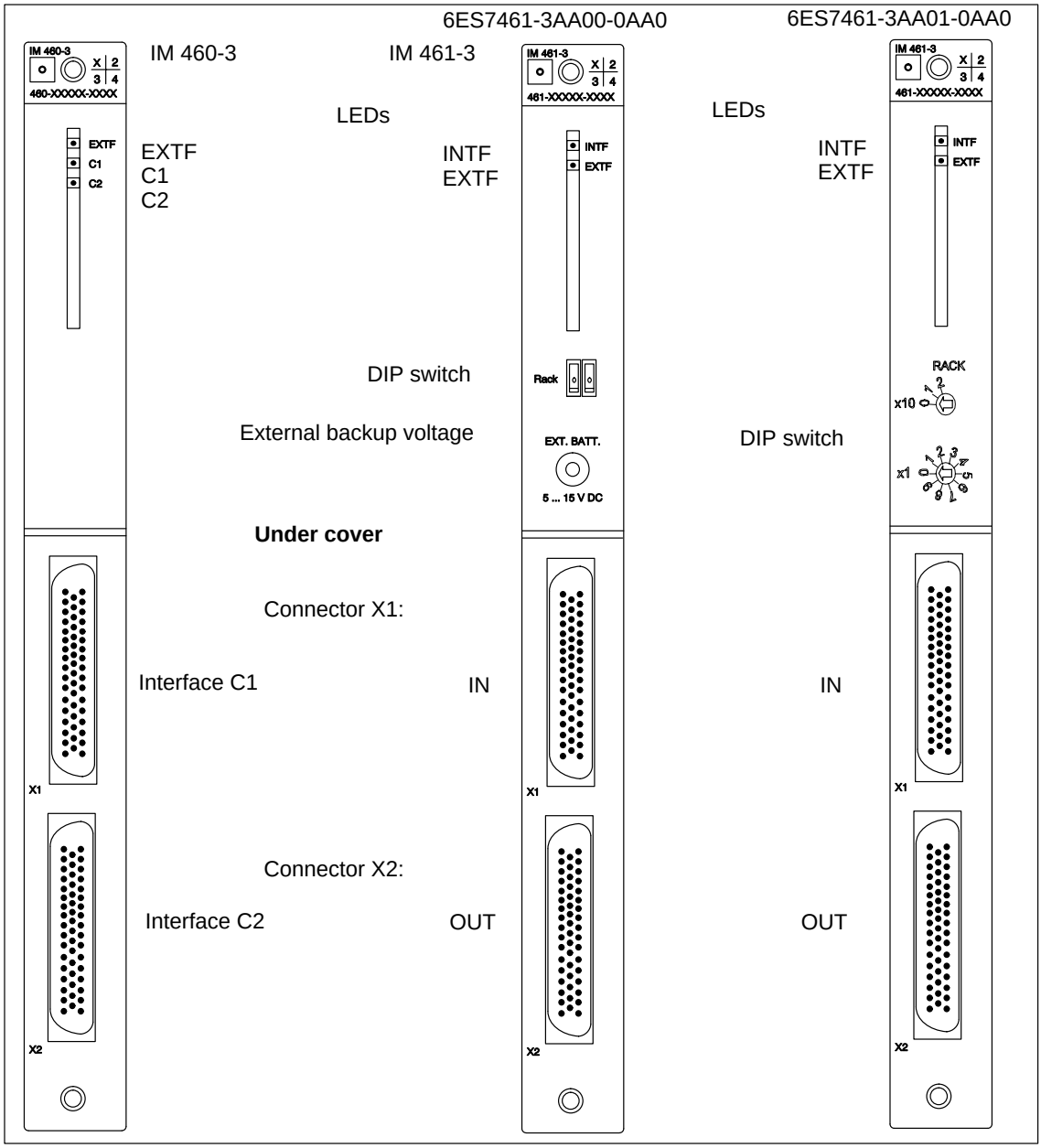


Figure 6-4 Position of the Operator Controls and Indicators of the IM 460-3 and IM 461-3

Function

The interface module pair IM 460-3 (send IM) and IM 461-3 (receive IM) are used for a remote link of up to a maximum 102 m (exactly: 100 m plus inputs/outputs of 0.75 m in the line). The communication bus is transferred at the full transmission rate.

Parameterization

Using the DIP switch on the front panel of the module, you must set the number of the mounting rack that the receive IM is installed on. The permitted range is 1 to 21.

If required, you can change the distance setting for the line on the programming device using STEP 7.

The default setting for the distance is 100 m.

Ensure that the distance corresponds as closely as possible to the current length (the sum of all the connecting cables per line) as this will accelerate data transmission.

Note

The distance set must always be longer than the actual length of cable per line.

Setting/Changing the Number

Proceed as follows:

1. Put the switch of the power supply module in the EU in which you want to make a change in the position ⏻ (Output voltage 0 V).
2. Enter the number using the DIP switch.
3. Switch the power supply module on again.

Operator Controls and Indicators on the Send IM

EXTF LED (red)	Lights up in the event of an external fault Line 1 or line 2 is faulty (terminator missing or broken cable)
C1 LED (green)	Line 1 (via front connector X1, connection 1) is correct.
C1 LED (flashing green)	An EU in the line is not ready for operation because • The power supply module is not switched on or • A module has not yet completed the initialization process
C2 LED (green)	Line 2 (via front connector X2, connection 2) is correct.
C2 LED (flashing green)	An EU in the line is not ready for operation because • The power supply module is not switched on or • A module has not yet completed the initialization process

Operator Controls and Indicators of the Receive IM

INTF LED (red)	Lights up if a rack number > 21 or = 0 was set. Lights up if you have changed the rack number under voltage.
EXTF LED (red)	Lights up in the event of an external fault (line fault, for example, if the terminator is not inserted or if a module has not yet completed the initialization process, or if the CC is switched off)
DIP switch	DIP switch to set the number of the mounting rack.
Socket for external backup voltage EXT.BATT.	On the IM 461-3 (order number 6ES7461-3AA00-0AA0) you can connect an external backup voltage (5 V to 15 V) or a central backup to this socket when you want to replace the mounting rack power supply. This will ensure a backup of the corresponding EU without interruption. If you use the receive IM in a cabinet, you should, for reasons of space, use an angled connector for the incoming supply.
Front connector X1	Upper connector (input) for the connecting cable from the previous interface module.
Front connector X2	Lower connector (output) for the connecting cable to the next interface module or for the terminator.

Technical Specifications of the IM 460-3 and IM 461-3

Maximum line length (total)	102 m
Dimensions W x H x D (mm)	25 x 290 x 280
Weight • IM 460-3 • IM 461-3	 630 g 620 g
Current consumption from the S7-400 bus 5 VDC • IM 460-3 • IM 461-3	 Typ. 1350 mA Max. 1550 mA Typ. 590 mA Max. 620 mA
Power loss • IM 460-3 • IM 461-3	 Typ. 6750 mW Max. 7750 mW Typ. 2950 mW Max. 3100 mW
Terminator	6ES7461-3AA00-7AA0
Backup current	No