

Autonics

Digital Fiber Optic Amplifier Communication Converter

BFC SERIES

M A N U A L



Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow:
 - Warning** Serious injury may result if instructions are not followed.
 - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
 - Caution:** Injury or danger may occur under special conditions.

Warning

- In case of using this unit with machinery (Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc.), it is required to install fail-safe device, or contact us for information required. It may cause a fire, human injury or property loss.
- Do not disassemble or modify this unit. Please contact us when required. It may give an electric shock and cause a fire.

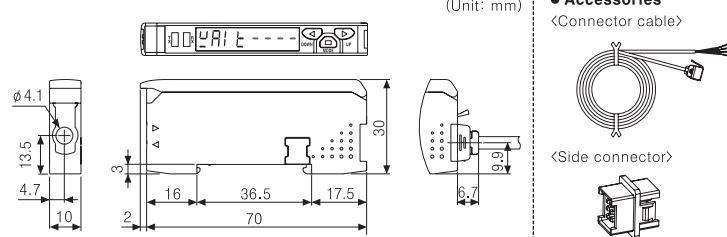
Caution

- This unit shall not be used outdoors. It might shorten the life cycle of the product or give an electric shock. Use this product indoors only. Do not use the product outdoors or at locations subject to the temperature or humidity of outdoors. (Example: rain, dirty, frost, sunlight, condensation, etc.)
- Do not use this unit where inflammable or explosive gas exists. It may cause a fire or explosion.
- Please observe the rated specifications. It may damage or shorten the life cycle of the product.
- Do not use this unit beyond rated power and do not supply AC power to a DC power type product. It may cause a damage to the product.
- Please check the polarity of power and wrong wiring. It may cause a damage to the product.
- Do not use this unit where there is vibration or a chance of impact. It may cause a damage to the product.
- When cleaning the unit, do not use water or an oil-based detergent. It may cause a fire, give an electric shock or damage to the product.

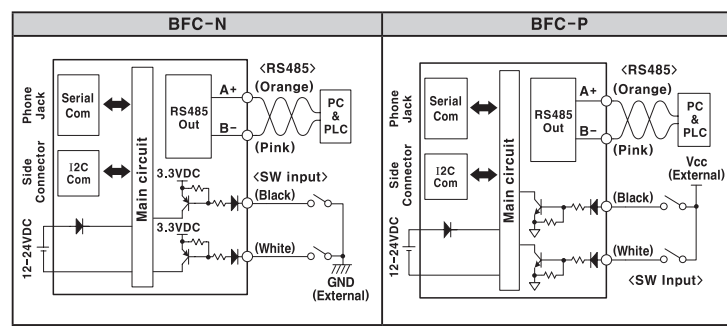
Proper usage

- Before using this communication converter unit, depending on the usage environment, keep following items handy.
- Visit our web site (www.autonics.com) to download.
- DAQMaster program (Integrated device management program), User Manual
 - SCM-US Driver (USB driver, Serial port driver), Manual
 - SCM-US481 Driver (USB driver, Serial port driver), Manual
 - SCM-381 Manual
 - Communication converter unit BFC User Manual For Communication

Dimensions



Connections



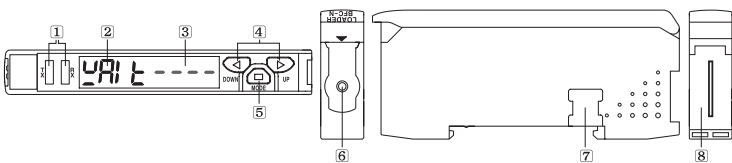
*The above specifications are subject to change and some models may be discontinued without notice.

Specifications

Type	NPN Solid-state input	PNP Solid-state input
Model	BFC-N	BFC-P
Power supply	(*)1	12~24VDC ±10%
Current consumption		Max. 40mA
SW input (SW1, SW2)	SW1/SW2 - HH: Standby, HL: BANK0, LH: BANK1, LL: BANK2	SW1/SW2 - LL: Standby, LH: BANK0, HL: BANK1, HH: BANK2
Communication function	RS485 Communication, Serial Communication, SW input	
Communication speed	1200, 2400, 4800, 9600, 19200, 38400bps	
Indication	<ul style="list-style-type: none"> Parameter: Red 4digit 7segment Setting value: Green 4digit 7segment Indicator: TX indicator (Red), RX indicator (Green) 	
Function	<ul style="list-style-type: none"> Real-time monitoring (incident light level, on/off state) Executes every BF5 feature and sets parameter by external device (Master) 	
Environment	Ambient temperature: -10 to 50°C, Storage: -20 to 60°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH	
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each of X, Y, Z directions for 2 hours	
Shock	500m/s ² (50G) X, Y, Z directions for 3 times	
Protection	IP40 (IEC standards)	
Material	PBT, PC	
Accessory	Connector cable (ø4, 4P, 2m, AWG 22, Insulator diameter: ø1.25), side connector	
Approval	CE	
Unit weight	Approx. 15g	

- *1: Powered by supply voltage of the amplifier unit connected by a side connector.
- * Environment resistance is rated at no freezing or condensation.

Parts description



- TX (Send) - Red LED, RX (Receive) - Green LED:** Turns on when communicates and inputs SW.
- Parameter indication (4digit Red 7segment):** Indicates parameter and processes of communication instruction/execution.
- Setting value indication (4digit Green 7segment):** Indicates setting value and process of communication instruction/execution.
- UP, DOWN key:** To modify setting value.
- MODE key:** To shift or select parameter when entering parameter setting mode.
- PC loader port:** In case of PC communication, use USB to Serial converter (SCM-US, sold separately).
- Side cover:** To connect an amplifier unit, use a side connector (accessory). Remove the side cover to connect the amplifier unit.
- Connector cable port:** The terminal for attaching a connector cable (accessory) is used for RS485 communication or SW input.

Installations

- DIN rail installations**
 - Attachment (Picture 1)**
 - Hang up the backside holder of the communication converter unit on DIN rail.
 - Press the front part of the communication converter unit toward DIN rail.
 - Detachment (Picture 2)**
 - Slide the back part of the communication converter unit as shown in figure ①.
 - Lift up the communication converter unit as shown in figure ②.

- Communication converter unit (BFC Series) and Amplifier unit (BF5 Series) Connection**
 - Remove the side cover at the side of communication converter unit where amplifier unit will be connected.
 - Attach the side connector to the socket on the side of the communication converter.
 - After attaching the communication converter unit and the amplifier unit to the DIN rail, push gently to have both units fastened into each other.
 - * Improper connection may cause malfunction.
 - * Do not supply the power while connecting or disconnecting.

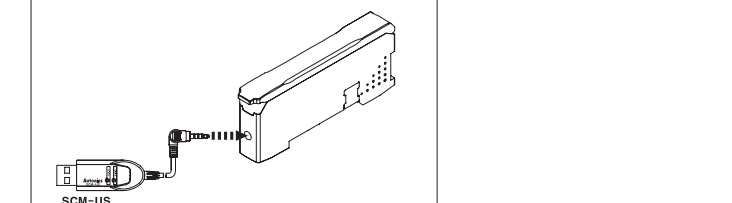
- Connector cable attachment and detachment**
 - Attachment (Picture 3)**

Insert the connector cable into the installed communication converter unit on DIN rail until it clicks.
 - Detachment (Picture 4)**

Pull out the connector cable with pressing the connector cable lever downside.

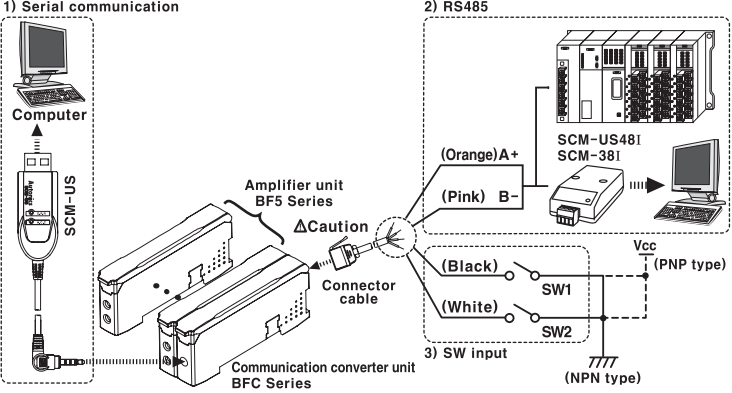
- USB to Serial converter (SCM-US) attachment and detachment**

Connect the USB to Serial converter, SCM-US (sold separately), to PC loader port.



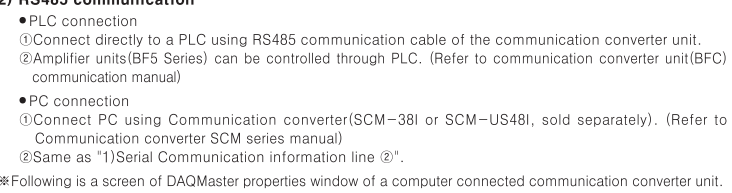
Communication mode

This communication converter unit supports 2 communication modes and SW input mode. You can use only 1 mode of 3 modes.



Caution: Do not connect a powered BF5 connector cable to a communication converter unit (BFC). (It may cause damage the product.)

- Serial communication**
 - Connect the USB to Serial converter (SCM-US, sold separately) to the PC loader port for communicating with PC.
 - It is very easy to manage parameters and monitor data of connected amplifier units (BF5 Series) using the integrated management program DAQMaster (free). (Refer to DAQMaster and amplifier unit manuals)
- RS485 communication**
 - PLC connection
 - Connect directly to a PLC using RS485 communication cable of the communication converter unit.
 - Amplifier units (BF5 Series) can be controlled through PLC. (Refer to communication converter unit (BFC) communication manual)
 - PC connection
 - Connect PC using Communication converter (SCM-381 or SCM-US481, sold separately). (Refer to Communication converter SCM series manual)
 - Same as "1) Serial Communication information line ②".



- Config**

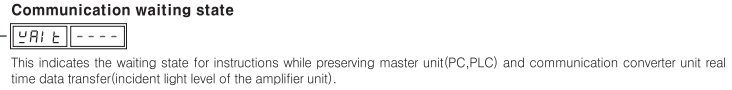
Indicates the number of amplifier units connected to the communication converter unit (BFC).
- Status**

Indicates the information of the selected amplifier unit (Dual, Single) by channel, connected to communication converter unit (BFC).
- Program group**

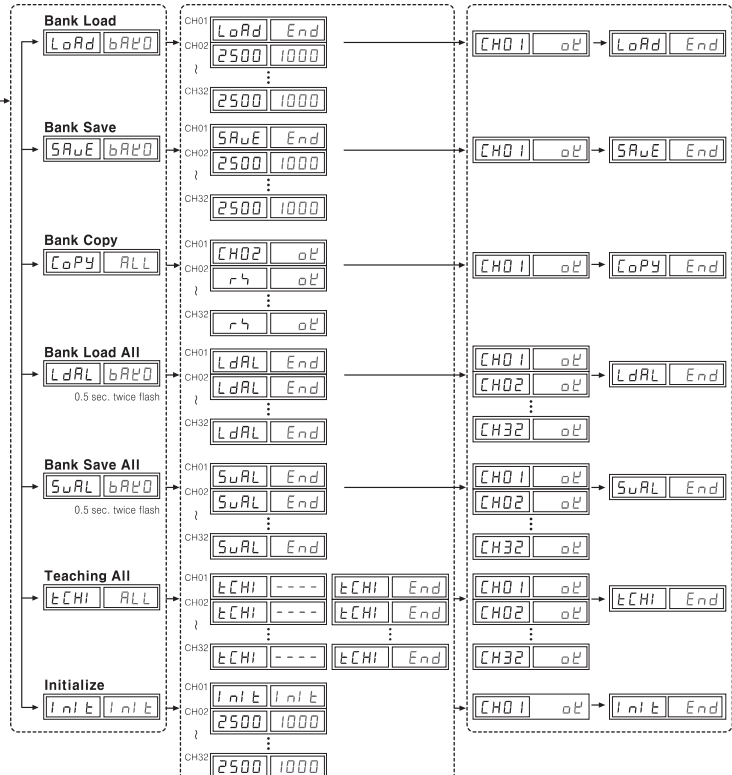
Setting values of the amplifier unit can be changed. When setting values of the amplifier unit changed, TX (Red) and RX (Green) LEDs on communication converter unit will flash indicating application of setting values to the amplifier unit.
- Data Bank Group**

Data bank and group teaching features of amplifier unit can be set. Amplifier unit can be initialized as well.

* Indications appear on communication converter and amplifier units depending on applied instruction are shown below.



This indicates the waiting state for instructions while preserving master unit (PC, PLC) and communication converter unit real time data transfer (incident light level of the amplifier unit).



- Data Bank**

Setting value of data bank (Bank 0, Bank 1, Bank 2) can be saved.

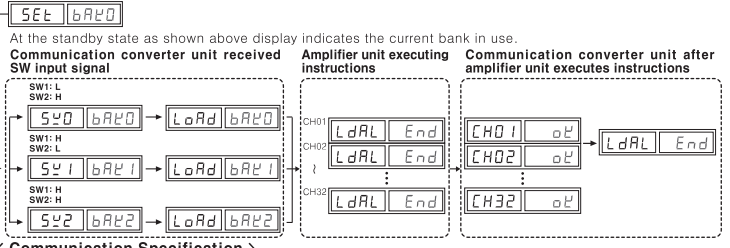
SW input

SW input is a feature which allows amplifier unit connected with the communication converter unit to load all banks. Applying signals to SW1 (Black) and SW2 (White) of the connector cables which is connected to the communication converter unit allows change of banks as shown in chart 1. (SW input signal duration should be longer than 3 seconds.)

[Chart 1] Bank selection table based on SW input

Bank	NPN		PNP	
	SW1	SW2	SW1	SW2
1 Standby signal (Using set Bank)	H	H	L	L
2 Bank 0	H	L	L	H
3 Bank 1	L	H	H	L
4 Bank 2	L	L	H	H

* Indications appear on communication converter and amplifier units depending on applied instruction are shown below.

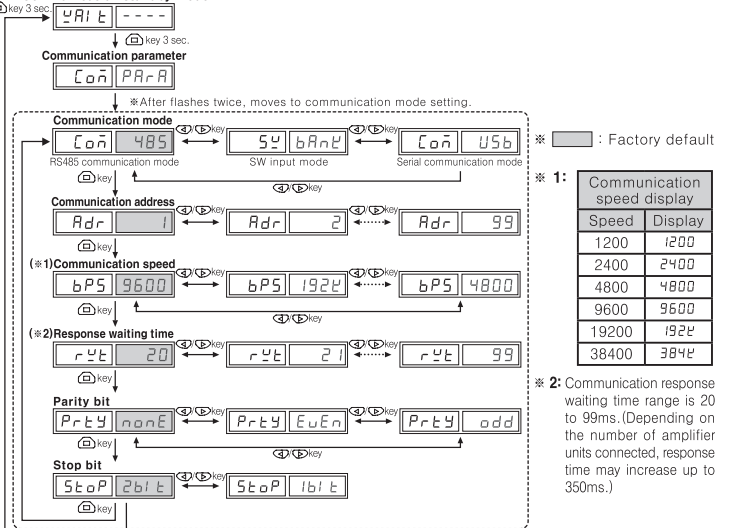


< Communication Specification >

	EIA RS485	Standard	EIA RS485
Maximum connections	31 (Address setting: 01~99)	Response waiting time	20~99ms
Communication method	2-wire half duplex	Start bit	1bit (Fixed)
Synchronization method	Asynchronous	Stop bit	1bit, 2bit
Effective communication distance	Max. 800m	Parity bit	None, Even, Odd
Communication speed	1200, 2400, 4800, 9600, 19200, 38400bps	Data bit	8bit (Fixed)
		Protocol	Modbus RTU

* It is not allowed to set overlapping communication address at the same communication line.
* Please use a proper twist pair for RS485 communication.

Parameter setting



Troubleshooting

Error Code	Description	Solution
E-r	Reading/Writing errors occur while processing data in EEPROM of amplifier unit.	Check the circuitry around EEPROM inside the product.
E-b	Slave fails to execute Master's group instructions such as Copy/Load/Save/Teaching sent through communication line due to unstable communication line. Other communication problems.	Check the connection status between communication unit and amplifier units. Check the circuitry around the side connector and hardware condition.

Solution methods for communication problems

- Communication errors during Serial or RS485 connections.
 - Check if the communication mode selected in communication converter unit suits installation environment.
 - Check and equalize the address of communication converter unit and address set in DAQMaster.
 - Check and equalize the communication port of communication converter unit and the communication port number set in DAQMaster.
- Communication errors during SW signal input
 - Check if the communication mode set in communication converter unit is SW input mode (SW Bank).
 - Check if the connections are made thoroughly depending on NPN or PNP input type.

Caution for using

- In case power is supplied from a switching power supply, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground and connect a condenser between 0V and F.G. terminal for noise removal.
- Avoid using the unit where dust exists or corrosion causing environments. It may cause product malfunction.
- Do not start operating during initial power supplying time (3 sec.).
- In case moving the unit from cold outside to an indoor room, start operating after removing moisture.
- Do not wire high voltage / power source line and unit together. It may cause product damage or malfunction due to noise.
- Do not use the unit outdoor or anywhere exposed to direct extraneous light. In case of max. sensitivity setting, there might exist slight sensing distance difference due to each feature deviation.
- Please note that this unit is non-isolated.
- Installation environment
 - It shall be used indoor.
 - Altitude Max. 2,000m
 - Pollution Degree 3
 - Installation Category II

* It may cause malfunction if above instructions are not followed.

Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system (Fiber, CO₂, Nd:YAG)
- Laser welding/soldering system

- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

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