MITSUBISHI ELECTRIC

MITSUBISHI INDUSTRIAL ROBOT

Teaching Pendant Switch Status Output Unit

CR750/CR800 controller

MELFA

BFP-A3339-A

⚠ Precaution

- Do not use the unit over the rated current, otherwise the unit may be damaged.
- Please wire the cable in the shortest path to avoid noise.
- Make sure that the unit is turned off when you wire , connect or disconnect the connector, otherwise the unit may be damaged.
- Do not drop or hit, otherwise the unit may be damaged.
- Do not tug the cable while connecting the cable, otherwise the unit may be damaged.

■Unit items

Please check all items are included in the package (See the below table).

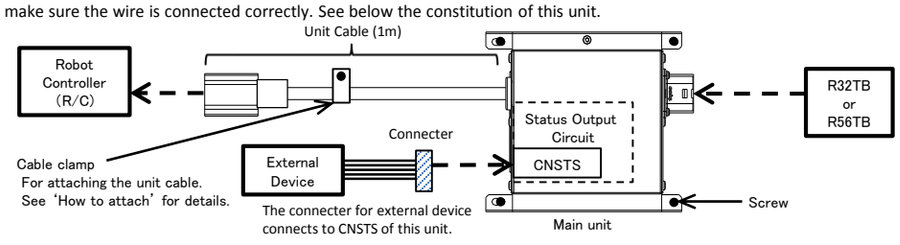
Item	Qty.	Remarks
2F-TBSTS-01	1	Main unit
Connector	1	For connecting to external device
Cable clamp	1	For unit cable
Screw	5	For attaching unit (4 pieces) , For attaching cable clamp (1piece)
Manual	1	This document
Dummy Plug (2D-DP1)	1	Connect when T/B is not used. (If you use this unit, it is also required for the CR800 controller.)

■Introduction

This manual describes the 2F-TBSTS-01 in detail. Teaching pendant Switch Status Output Unit(2F-TBSTS-01) is the unit for outputting the status of the switch on T/B(R32TB, R56TB), such as emergency stop, to external device.

■Configuration

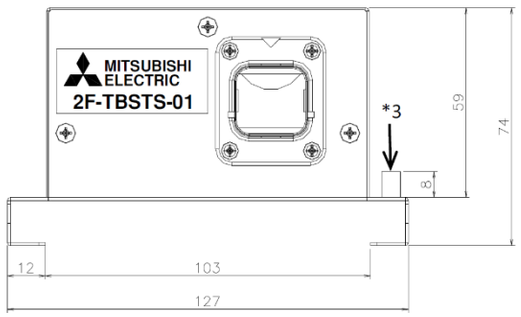
This unit is connected between Robot controller and T/B. Please wire the connecter to external equipment yourself. Pease make sure the wire is connected correctly. See below the constitution of this unit.

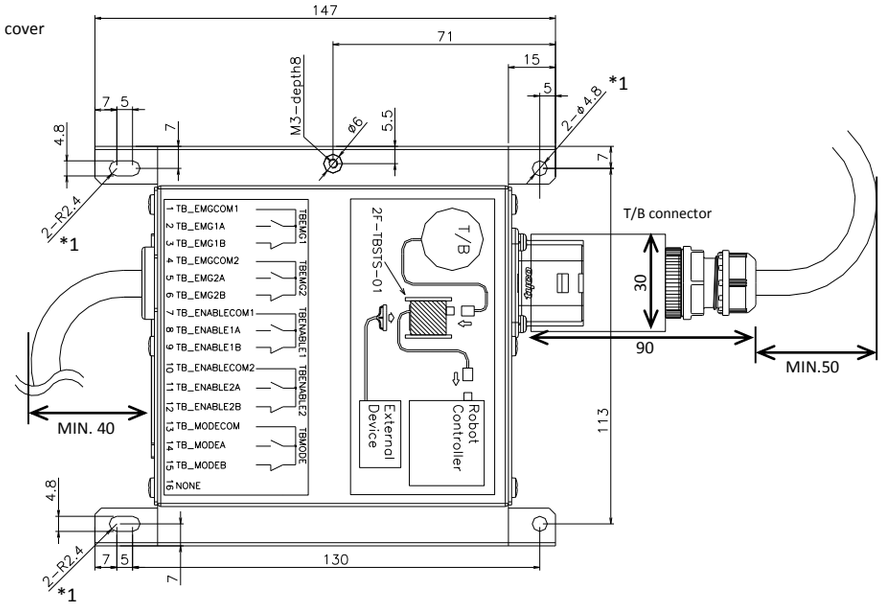


■External View

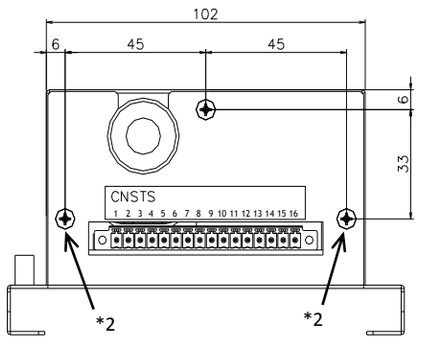
*1:Holes to attach this unit
*2:Use when attach ESD countermeasure cover
*3:FG terminal

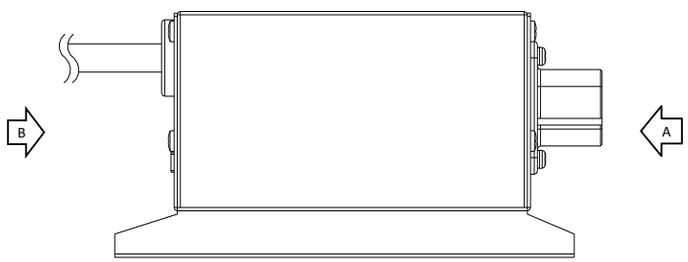
Front view(View from A)





Rear View(View from B) Unit Cable:Hidden





■Specification

Item	Content	Remarks
Model name	2F-TBSTS-01	
Supported robot	RH-F series, RV-F series RH-FR series, RV-FR series RV-CR series, RH-CRH series RV-AS series	
Supported robot controller	CR750 /CR800*1	Not supported CR751 *1 T/B at the time of use of this unit, it is not possible to attach and detach at the time of AUTO mode.
Supported T/B	R32TB, R56TB	T/B:Teaching Pendant
Cable	Type:Cable with shield Conductor size:0.14～1.5mm² (AWG28～16) Cable length:Max.10m	For connecting to the external device. Not included. Please see "Wiring directions" for details.
Output status	1. ON/OFF status of [Emergency stop] switch(channel 1, channel 2) 2. ON/OFF status of [Enable] switch (channel 1, channel 2) 3. ON/OFF status of [Enable/Disable] switch	Please see "CNSTS connecter", "Status output circuit diagram", "Details of circuit operation" for details.
Maximum current	0.2A	Each status output pin of CNSTS connector Rated current: 0.1A
Protection specification	IP20	
Environment	General environment	Without inflammable gas or corrosive gas
Ambient temperature	0～40℃	
Ambient humidity	45～85%	Without dew drops
Mass	Approx. 1kg	Unit cable included

■How to attach

Please attach this unit with M4 screw in the holes provided (*1 holes in external view). Please use cable clamp for arranging unit cable.

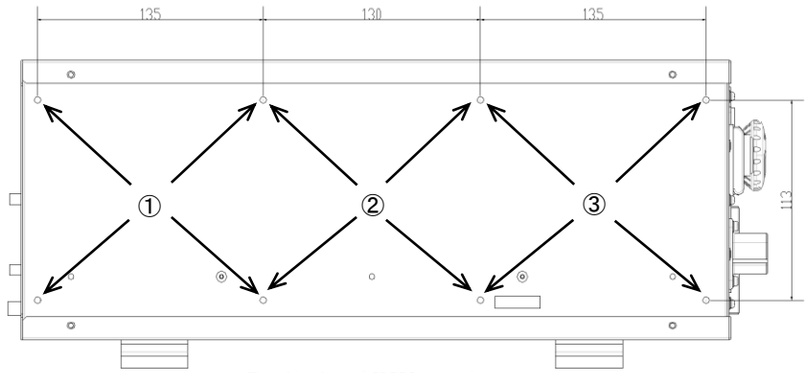
(Case to attach on the side of CR750 controller)

There are 8 holes for M4 screw on the side of the controller(See the side view of robot controller)。Please attach it to ①, ②, or ③. Be careful not to interface with surrounding components. The diagram to attach this unit on the side of robot controller is below. Make sure the screw type is correct before attaching.

Screw type

M4 screw length :8mm(4 screws included) NOTE: If the screw type is not correct, the robot controller may be damaged.

Tightening torque :1.5N·m



The side view of CR750 controller

Figure of the diagram to attach the unit

■CNSTS connector

Caution 1: Do not connect the connector for external device to CNUSR connector of CR750 controller.
2:Take measures for chattering. There are relays in this unit.

You can get the status of three types of T/B switch status from pin status of the CNSTS connector. Here is the details of CNSTS connector. The switch statuses you can get are below.

1. [Emergency stop] switch status (on/off)
2. [Enable] switch status (on/off)
3. [Enable/Disable] switch status (on/off)

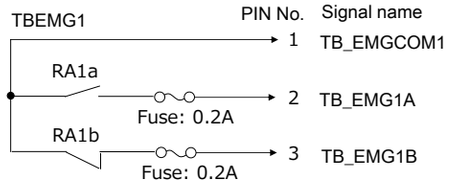
Table 1 shows the pin no., signal name, and the details. Please see “Status output circuit diagram” in this manual for circuit diagrams.

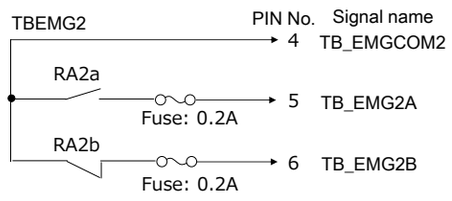
Table 1. Pin assignment

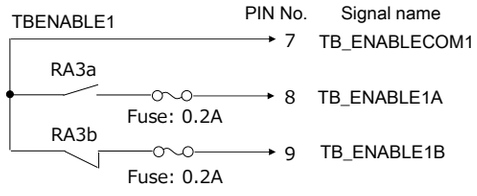
Circuit name	Pin no.	Signal name	Signal details
TBEMG1	1	TB_EMGCOM1	COMMON
	2	TB_EMG1A	Output of [Emergency stop] switch channel 1 status (on / off).
	3	TB_EMG1B	Signal for relay fault detection.
TBEMG2	4	TB_EMGCOM2	COMMON
	5	TB_EMG2A	Output of [Emergency stop] switch channel 2 status (on / off).
	6	TB_EMG2B	Signal for relay fault detection.
TBENABLE1	7	TB_ENABLECOM1	COMMON
	8	TB_ENABLE1A	Output of [Enable] switch channel 1 status (on / off).
	9	TB_ENABLE1B	Signal for relay fault detection.
TBENABLE2	10	TB_ENABLECOM2	COMMON
	11	TB_ENABLE2A	Output of [Enable] switch channel 2 status (on / off).
	12	TB_ENABLE2B	Signal for relay fault detection.
TBMODE	13	TB_MODECOM	COMMON
	14	TB_MODEA	Output of Enable/Disable] switch status (on / off).
	15	TB_MODEB	Signal for relay fault detection.
	16		No connection

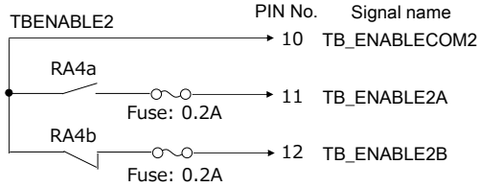
■Status output circuit diagram

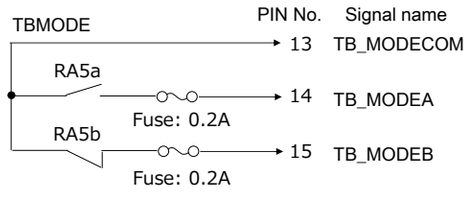
Schematic diagrams of status output circuits are below.
The fuses in the circuit are resettable fuse.
The maximum current of the each pin is 0.2A











■Details of circuit operation

See below for details.

TBEMG1(channel 1), TBEMG2(channel2)

T/B switch status	Relay status		Status of the inside circuit
[Emergency stop] switch off	RA1a	CLOSE	1[4] TB_EMGCOM1[2]
	RA1b	OPEN	2[5] TB_EMG1A[2A]
	RA2a	CLOSE	NC — 3[6] TB_EMG1B[2B]
	RA2b	OPEN	
[Emergency stop] switch on (emergency stop enable)	RA1a	OPEN	1[4] TB_EMGCOM1[2]
	RA1b	CLOSE	NC — 2[5] TB_EMG1A[2A]
	RA2a	OPEN	3[6] TB_EMG1B[2B]
	RA2b	CLOSE	

TBENABLE1(channel1), TBENABLE2(channel2)

T/B switch status	Relay status		Status of the inside circuit
[Enable] switch off (not push switch / push switch strongly)	RA3a	OPEN	7[10] TB_ENABLECOM1[2]
	RA3b	CLOSE	NC — 8[11] TB_ENABLE1A[2A]
	RA4a	OPEN	9[12] TB_ENABLE1B[2B]
	RA4b	CLOSE	
[Enable] switch on (push switch)	RA3a	CLOSE	7[10] TB_ENABLECOM1[2]
	RA3b	OPEN	8[11] TB_ENABLE1A[2A]
	RA4a	CLOSE	NC — 9[12] TB_ENABLE1B[2B]
	RA4b	OPEN	

TBMODE

T/B switch status	Relay status		Status of the inside circuit
[ENABLE/DISABLE] switch off /（T/B disable）	RA5a	OPEN	13 TB_MODECOM
	RA5b	CLOSE	NC — 14 TB_MODEA
			15 TB_MODEB
[ENABLE/DISABLE] switch on /（T/B enable）	RA5a	CLOSE	13 TB_MODECOM
	RA5b	OPEN	14 TB_MODEA
			NC — 15 TB_MODEB

■Wiring directions

1. Tools required (not included)

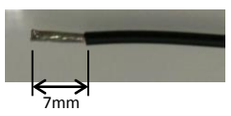
DIN standard flathead screwdriver (blade thickness:0.4mm blade width:2.5mm)
Recommended tool: SZS 0-0.4x2.5 (PHOENIX CONTACT), SZF 0-0.4x2.5(PHOENIX CONTACT)

2. Cable (not included)

Solid cable / stranded cable :0.14～1.5mm² （AWG28～16）
Stranded with ferrules without plastic sleeve :0.25～1.5mm²
Stranded with ferrules with plastic sleeve :0.25～0.5mm²

3. Wiring procedure

(1) Stripe cable(length: 7mm)



(2) Loosen the screw

(3) Insert the cable to the connection hole

(4) Tighten the screw

■Measures against noise / static electricity

1. Measures against noise

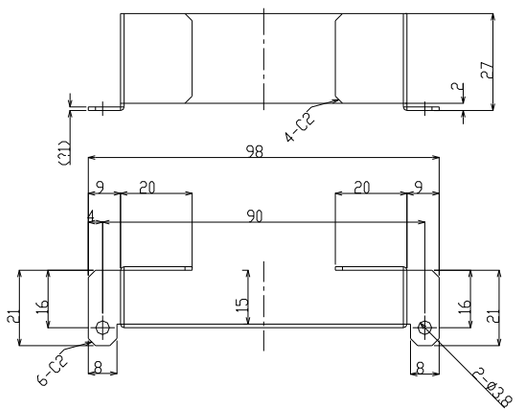
If there are problems due to noise, please connect this unit to ground using *3 screw hole in outline drawings. Screw and cable are not included.

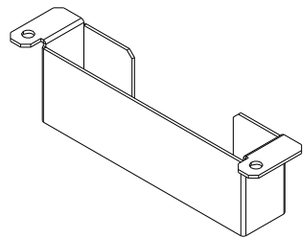
Screw type : M3
Screw length : 6mm
Tightening torque : 0.63N·m

2. Measures against static electricity

If there are problems due to static electricity, please connect this unit to ground (see “Measures against noise”) and attach cover. Below figure is an example of the cover. Please *2 screws in the outline diagram when you attach the cover.

Tightening torque : 0.63N·m





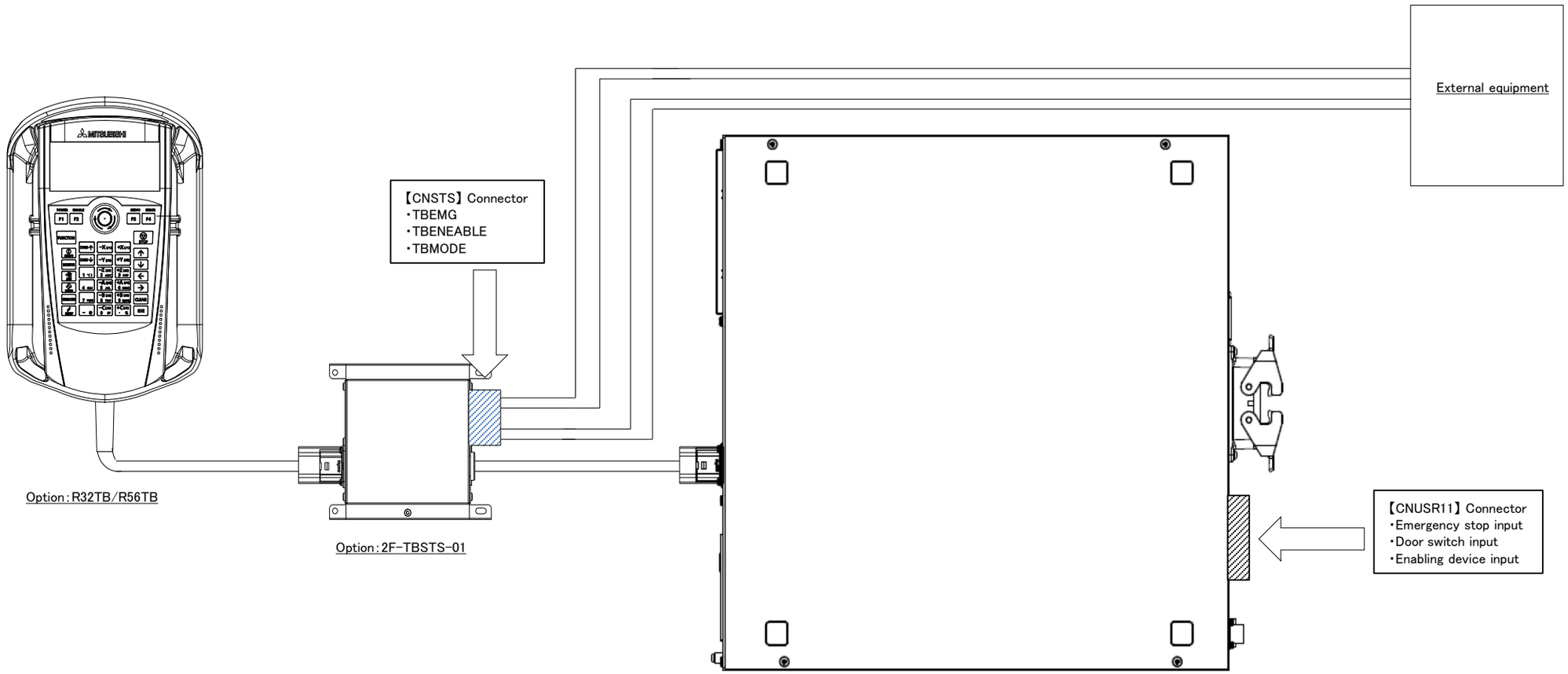
Recommend material : Steel

■Troubleshooting

Trouble	Cause	Measures
Different from “Details of circuit operation”.	wrong wiring	Please wire the cable properly in reference to “Details of circuit operation”
	Relay fault	Please contact service provider. The unit needs to be replaced. When the output status of the signal for relay fault detection (TB_EMG1B, TB_EMG2B, TB_ENABLE1B, TB_ENABLE2B, TB_MODEB) does not change in accordance with the output status of the signal for T/B switch (TB_EMG1A, TB_EMG2A, TB_ENABLE1A, TB_ENABLE2A, TB_MODEA), the relay is broken.
	Over-current	Maximum current is 0.2 A. Please redesign the circuit configuration to reduce the current.

■Example of wiring

The C800 controller provides examples of wiring to monitor the status of the R32TB/R56TB emergency stop button.
By monitoring the contacts of A and B of the relay output from the CNSTS connector, it is possible to detect the welding of the relay.



Wiring details