NETIMPRESS avant

Flash Programmer
Hardware Manual

DTS INSIGHT CORPORATION

Revision History

Edition	Date of Issue	Modifications
1st Edition	20 Oct, 2018	Initial publication
2nd Edition	20 Jan, 2020	Correction of errors, Describe QSPI signal
3rd Edition	07 Aug, 2020	Describe SWD signal
4th Edition	14 Oct, 2020	Describe PHX401
5th Edition	22 Jan, 2021	Describe BDM signal
6th Edition	23 Aug, 2021	Changed exterior photos of PHX series because of adding “Ground Terminal” description Added PHX400 AC characteristic
7th Edition	28 Dec, 2023	Corrected DIO interface error Corrected PHX401 equivalent circuit error Added PHX400 and PHX401 TCK equivalent circuit Corrected PHX400 and PHX401 QSPI signal names

(3) If any question about the contents of this manual arises, contact DTS INSIGHT CORPORATION.

(4) DTS INSIGHT CORPORATION shall not be held responsible for direct or indirect adverse effects resulting from operation of this system irrespective of the above item (3).

(5) Product and company names mentioned in this manual are the trademarks of their respective owners.

Introduction

NETIMPRESS avant Hardware Manual (hereinafter "manual") describes specification of hardware of NETIMPRESS avant series products, and the precautions.

There is another manual besides this manual for NETIMPRESS avant series products (hereinafter NETIMPRESS avant). – "NETIMPRESS avant Operation Manual", which describes how to use NETIMPRESS avant. Please read the manual along with this manual.

The wording Programming in this manual means writing data into a target microcomputer flash memory or an external flash memory connected to the target microcomputer.

ICON

The following table describes the meaning of icons used in this guide.

	It indicates very important information. Be sure to perform an operation with extra care.
	It indicates useful information and tips for operation.
	It indicates references. Please see the referenced chapter of this manual and other manuals, if you needed.

For Your Safety

In order to ensure the proper and safety use of NETIMPRESS avant, please be sure to follow the safety precaution mentioned below as operating NETIMPRESS avant. DTS INSIGHT CORPORATION has no responsibility or guarantee for any injuries which occur as a result of the violation of these safety caution and warnings.

This manual uses the icons as below to use NETIMPRESS avant safety.

	It indicates not only that there is a danger to human as well as to the equipment, but also that it is necessary to refer to the instruction manual.
	It indicates a safety ground terminal. As this terminal is on the main unit, please be sure to connect this terminal to the ground before operating.
Warning	In order to avoid the risk of death or serious injury which may occur as a result of an incorrect use.
Note	In order to avoid the risk of minor or material damage which may occur as a result of an incorrect use.

■To avoid the risk of death or serious injury to users, such as electrocution or any other accidents, as well as the risk of damage to NETIMPRESS avant, please follow the warnings mentioned below.

 **Warning**

Use in Chemical Gases

Do not use NETIMPRESS avant in an environment where are combustible or explosive gases or steam.

Using NETIMPRESS avant in such environment is extremely dangerous.

Usage environment

This programmer is only for indoor use. Use it at an altitude of 2000 meters or less.

Available voltage range and power-supply frequency must not exceed the rated voltage ± 10%, 50/60 Hz±2 Hz.

We are assuming NETIMPRESS avant will be used under Overvoltage category II and Pollution Degree 2.

Install it around an electric outlet so that you can unplug it to shut down the power easily.

Power

Confirm that the supply-side voltage matches to the rated power supply voltage for a power supply pack of NETIMPRESS avant.

Use the AC cable provided with NETIMPRESS avant to ensure safe operation.

Do not use damaged AC cable.

Do not remove the case

Only qualified service engineers should remove the case of NETIMPRESS avant because of the high voltage.

Action to be taken if abnormality is found

If any failure is found, such as smoke or burnt odor, disconnect NETIMPRESS avant and the target. And then turn off the power of main unit. Contact the support center of DTS INSIGHT Corporation.

NETIMPRESS avant is an electronic device which consists of high-precision electronic components. Please be sure to understand and follow the caution listed below in order to avoid any accidents and as well as to make the most of your NETIMPRESS avant.

Note

Power On Sequence

Make sure to follow the switch ON/OFF order of each way of a host computer, NETIMPRESS avant, and a target system.

The Switch ON / Switch OFF sequence should be followed in order to avoid major damages to a target system and NETIMPRESS avant itself.

<Power On Sequence>

① Host computer

② NETIMPRESS avant

③ Target system

<Power Down Sequence>

① Target system

② NETIMPRESS avant

③ Host computer

Connecting the Probe and Connector

All probes and cables are designed to prevent an incorrect connection. Never force them to plug in nor unplug. Confirm the position and direction.

Insertion and removal of the Cable

Be sure NOT to insert and remove the cable while NETIMPRESS avant is powered on. (Pay special attention to the insertion and removal of the M12 cable between NETIMPRESS avant and the adaptor.) Otherwise, it may cause a serious damage to NETIMPRESS avant and a target system.

Disassembling NETIMPRESS avant

Since NETIMPRESS avant contains printed circuit boards with minute patterns, never remove screws or disassemble NETIMPRESS avant.

If the product is disassembled or modified by the user, it will not be covered under the warranty or support services **Neutralization**

Make sure to neutralize the charge before operating NETIMPRESS avant.

EU Directive

CE mark

Item	Compliant standards
CE Marking *1 	[EMC Directive] Emissions: EN61326-1 Class A Immunity: EN61326-1 Table 2 (for use in industrial locations) [RoHS Directive] EN50581:2012

*1 The product in which CE Marking is indicated on the product serial label is a target.

CAUTION

This instrument is a Class A product, and it is designed for use in the industrial environment. Please use this instrument in the industrial environment only.

WEEE marking
WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT DIRECTIVE (2012/19/EU)

Waste Electrical and Electronic Equipment Directive (WEEE) is for EU countries.

NETIMPRESS avant compiles with WEEE Directive (2012/19/EU). Electric/electronic products carrying this mark must be disposed of separately from normal household wastes.

Product category:

With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product. When disposing products in the EU, contact your local distributor. Do not dispose in domestic household waste.

IMPORTANT

Thank you for your purchasing “NETIMPRESS avant”.

To make the most of NETIMPRESS avant, please read and understand this manual and other operation manual before use. After reading this manual, please keep it for the further reference whenever required. Please ensure that NETIMPRESS avant should be used only by persons who have read and understood the manuals. We strongly recommend that the first-time users receive a proper instruction from those who have a good knowledge of NETIMPRESS avant.

NETIMPRESS avant refers to NETIMPRESS avant main unit and other related products manufactured by DTS INSIGHT Corporation. A target system and the host computer are strictly excluded.

NETIMPRESS avant is an electronic device which consists of high-precision electronic components. In order to make the most of NETIMPRESS avant and also to prevent any accidents, please follow the caution listed below.

A certain repair fee is required regarding the equipment damages resulted from an incorrect use or connection, etc. Please aware that it may require a few months for repairs.

Regarding software products and manuals, DTS INSIGHT Corporation guarantees only if there are any damages of media provided by DTS INSIGHT Corporation or manual defects.

If proved that there are failures or that there are problems apart from those listed above, the action will be taken based on the maintenance agreement.

⚠ Warning

Before Switching ON the power supply, be sure to confirm whether the direction of Pin 1 in the probe tip matches to Pin 1 Socket in a target system.

An incorrect connection may result in an explosion or ignition of NETIMPRESS avant or a target system.

Be sure to power off NETIMPRESS avant and a target system when inserting and removing the probe and various cables. In case of inserting and removing during in power-on status, it may result in the damage and an explosion or ignition of NETIMPRESS avant or a target system.

CAUTION

As particular parts of electronic circuits in the probe and cable tip are exposed, NETIMPRESS avant should be used only in environments where are protected from a static electricity.

Using NETIMPRESS avant in such environment as without static electric protection may result in destroying NETIMPRESS avant or a target system.

Be sure to power on NETIMPRESS avant first. Be sure to power on or off a target system while NETIMPRESS avant is powered on. An incorrect order may result in destroying the circuit of NETIMPRESS avant and a target system.

Glossary

Words & Terms	Description
Micom-pack	Package of a parameter file etc. which supports specific MCU. It can be available from our website. Micom-pack is a self-extraction file (EXE file). You can extract the file by double-clicking it. Contents of Micom-pack are Parameter file (.PRM), manuals (.PDF), write control program (.BTP), and readme file etc. Contains of the file vary depending on the MCU
Definition program	MCU-specific program to communicate each MCU. This is placed the each YIM folder in the SD card.
Definition license	To download the definition program into YIM folder, a definition license has to be added into the SD card for each definition program. This definition license file (.LCT file) can be downloaded if you register your information in our website by referring to the definition license sheet provided when you purchased the definition program. The definition license file can be added onto the dedicated SD card by using SWX600.
Probe logic license	To connect and communicate with the target system, you need a communication logic on the main unit side according to the connection destination. Probe logic license which enables this logic (.LPC) can be downloaded if you register your information in our website by referring to the definition license sheet provided when you purchased the definition program. The definition license file can be added onto the dedicated SD card by using SWX600.
Programming	Programming means to program the flash memory.

Table of Contents

1. Overview and Feature

This chapter describes the composition of programming environment, and overview of NETIMPRESS avant series products.

1.1. Product description

Below illustration is NETIMPRESS avant .

To use this series, you need to purchase accessories and peripherals separately in addition to the main unit. Please purchase them in accordance with your environment. ➥ For details, please see “5. Accessory (Optional)”.

If there is anything we can help you, please do not hesitate to contact your dealer or the sales department of DTS INSIGHT Corporation.

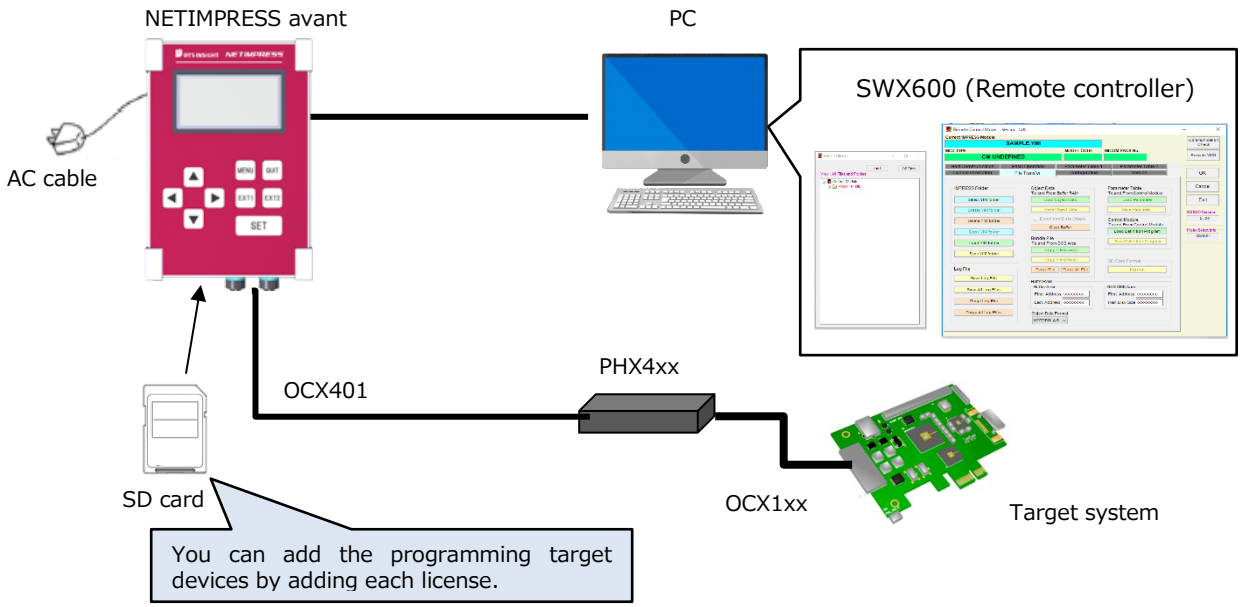
AC cable for power-on or SD card are not included in the main unit.

Please purchase them with the main unit.

Remote controller for NETIMPRESS avant (PC software:SWX600) can be downloaded from our website.
License sheet is necessary to download a Micom-pack, and definition license, and that license from our website. License sheet is provided when you purchase a definition license.

After unpacking, keep the package box contained the NETIMPRESS avant because it will be used at the time of maintenance service for the equipment.
Although we give our full attention to the products, if you find anything wrong with the items in the box, do not operate the product and contact with your dealer or the sales department of DTS INSIGHT Corporation.

NETIMPRESS avant is an in-circuit programmer for high-speed programming flash ROM internal microcomputer and flash ROM connected to external bus of the micro processor in board mounting status.



By adding each firm data (definition program file) for programming microcomputer into the SD card for NETIMPRESS avant, it can support various devices.

Setting conditions are stored in the SD card. Therefore you can use it as a stand-alone (without PC).

1.2. Communication Environments

Standard Ethernet TCP/IP can be used for communication between NETIMPRESS avant and a host PC. Therefore, a host PC is required to have a corresponding interface. If there is no interface, you need to add it.

The terminal at the side of NETIMPRESS main unit conforms to the 10BASE-T/100BASE-TX/ 1000BASE-T standards.

2. General Precautions

(1) Do not use NETIMPRESS avant in dusty areas, where there is direct sunlight or corrosive gas is generated.

(2) Use NETIMPRESS avant in environments with temperature between 5 and 40℃ and humidity between 20% and 80% (no condensation).

(3) To insert or remove the SD card, be sure to turn off the power of NETIMPRESS avant.

(4) In case there is noise in the AC power line, use a noise filter to eliminate the noise.

(5) To turn the power on, turn on the power of NETIMPRESS avant first and then a user system. To turn off the power, follow the reverse order.

(6) NETIMPRESS avant operates with the control module set into the SD card connector.

NETIMPRESS avant does not operate with the SD card being removed.

(7) Use only our designated power cord. Be sure to check power switch of NETIMPRESS avant is OFF, when connecting the power cord to an electrical outlet.

(8) Be sure to power off before installing or removing the probe on NETIMPRESS avant.

Visit our Web site for information about how to use NETIMPRESS avant and related products, and for the latest information. Please use it as reference.

3. Name and Function of the Components

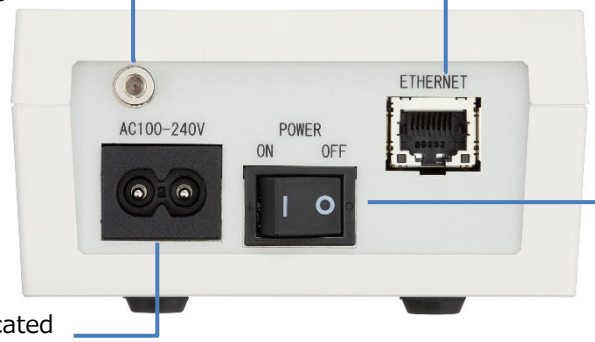
3.1. Name of Components

Ground Terminal

Ground terminal of NETIMPRESS avant

LAN Connector

Connector for Ethernet.



POWER SW

Power switch for turning on-off.

AC Inlet

Connector for AC cable dedicated to NETIMPRESS avant.

LCD

Displays various information, such as model name of definition program and address etc.

KEY

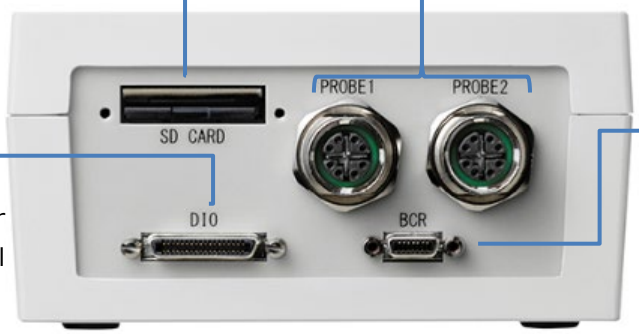
This is used when operating NETIMPRESS avant as a stand-alone.

SD CARD Slot

Slot for inserting the SD card.

Target Connector 1/2

This is the connector to connect the probe that connects with a target.



DIO Connector

This is the connector to control by Digital I/O.

BCR Connector

This is the connector to connect the probe that connects with a bar-code reader.

3.2. Function of Components

- Function of each key when operating NETIMPRESS avant as a stand-alone

8 keys are used when operating NETIMPRESS avant as a stand-alone.

Following table describes function of each key and the behavior.

QUIT	● QUIT button is used when you want to stop the operation. ● When you are operating MENU, it backs to the previous item by pressing the button.
SET	● SET button is used when you want to set and execute the settings.
MENU	● MENU button is used when you want to display the menu window.
EXT1/EXT2	● EXT1/EXT2 buttons are used to read corresponding execution file and sequence it.
▲ (Up)	● Arrow key is used when you want to scroll the mode setting menu or the command setting menu. ● This is also used when selecting MENU.
▼ (Down)	● Arrow key is used when you want to scroll the mode setting menu or the command setting menu. ● This is also used when selecting MENU.
◀ (Left)	● This is also used when selecting MENU.
▶ (Right)	● This is also used when selecting MENU.

4. Specifications

4.1. General Specification

Item	Specifications	
Storage environment	Ambient temperature	-5 to 50℃
	Ambient humidity	20 to 80% RH, no condensation
Operation environment	Ambient temperature	5 to 40℃
	Ambient humidity	20 to 80 % RH, no condensation
Power Supply	Input voltage range	AC 100 to 240 V 50 to 60 Hz
	Consumed power	Less than 12W(0.25A)
External dimensions	160 (L) x 110 (W) x 55 (H) mm	
Weight	750 g	
Installation	Lay down horizontally. Do not stack.	
Calendar	Error per year	±15 minutes/year
Ground terminal	Recommended screw size	M4 x 3mm+ (thickness of the plain washer)

4.2. Interface

4.2.1. Host Interface

Item	Specifications	
LAN port	Connector type	RJ45
	Baud rate	10BASE-T/100BASE-TX/1000BASE-T

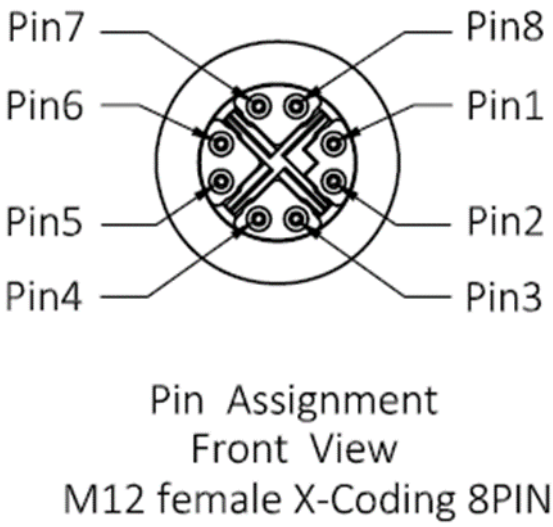
4.2.2. Display Interface

Item	Specifications	
LCD	Characters to be displayed	8 lines, 21 digits
	Backlight	yes

4.2.3. Target Interface

Item	Specifications	
Target connector	Type	M12
	Male/female	Female
	Number of port	2

- **Pin arrangement**



Connector pin arrangement (mate side view) Signal Table

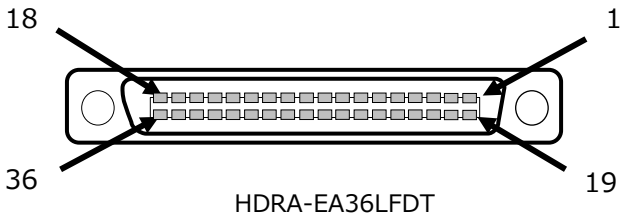
Table 1: AFX100 Probe Connector Signal List

pin No	Signal Name	definition	I/O
1	TX1+	Send data 1 + Output	O
2	TX1-	Send data 1 - Output	O
3	RX1+	Received data 1 + Input	I
4	RX1-	Received data 1 - Output	I
5	Reserved	Reserved signal line	-
6	Reserved	Reserved signal line	-
7	PWR	Power	O
8	GND	GND	-

4.2.4. DIO Interface

Item	Specifications	
DIO connector	Type	HDRA-EA36LFDT-SLE+ (Honda Tsushin Kogyo Co.,Ltd.)
Digital output	Number of status port	3 (Pass, ERR, RUN)
	Number of general purpose output port	5
Digital input	Number of script selection port	8 (select from 255 types)
	Number of general purpose port	5
	Number of control port	4 (STEP, START, EXT1, EXT2)
	Clear signal	1(CLR)
Power input	Power for output port	DOCOM, DOVCC
	Power for input port	DIVCC
	Insulation	Between input signal and output signal

- **Connector type**



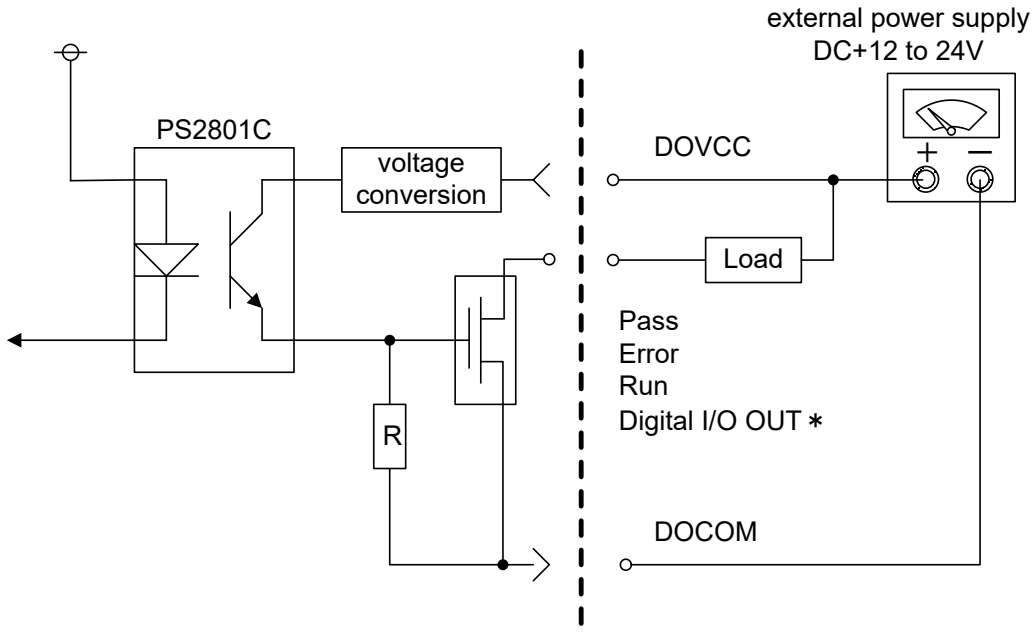
HDRA-EA36LFDT

(Honda Tsushin Kogyo Co.,Ltd)

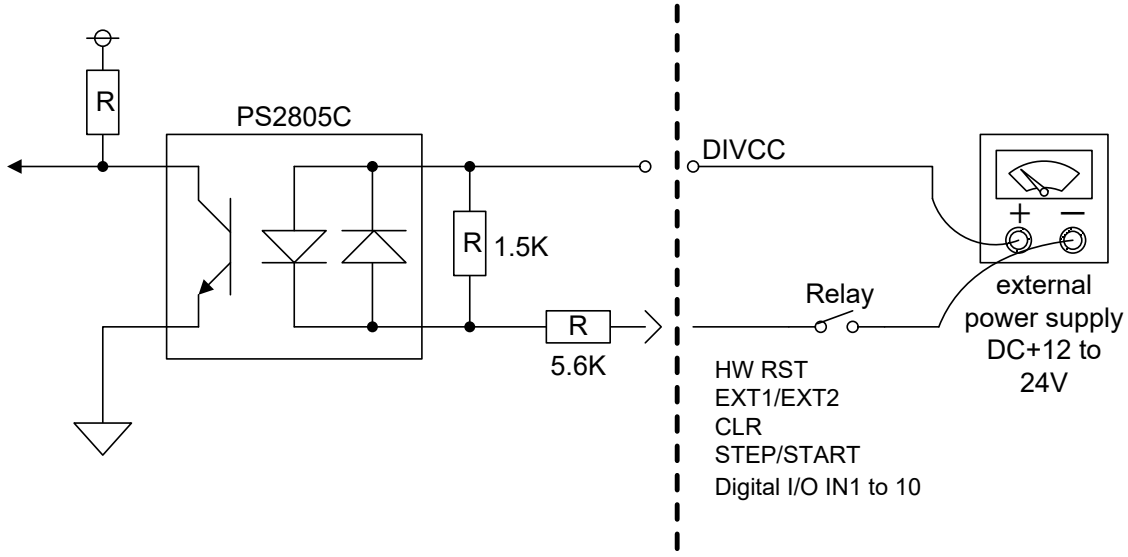
- **Pin assignment**

PIN No.	Signal Name	Definition	I/O	Type (*3)
1, 19	DOCOM	Isolation ground for Digital I/O OUT0 to 4, Pass, Error, and Run	-	-
2, 20	DOVCC	Power supply of overcurrent protection circuit	-	-
18, 27, 36	DIVCC	Isolation power switch for input	I	B
3	Pass	PASS status output signal Low: Normal end, Hiz: Other and above	O	A
4	Error	ERROR status output signal Low: Abnormal end, Hiz: Other than above	O	A
5	RUN	Operation condition output signal Low: Programming or function execution is currently being executed Hiz: Other than above	O	A
29	EXT1	EXT1 KEY Pin	I	B
30	EXT2	EXT2 KEY Pin	I	B
31	CLR	RESET KEY Pin/ User clear signal	I	B
34	Digital I/O ST0	Script selection signal 0 (Digital I/O input)	I	B
35	Digital I/O ST1	Script selection signal 1 (Digital I/O input)	I	B
10	Digital I/O ST2	Script selection signal 2 (Digital I/O input)	I	B
11	Digital I/O ST3	Script selection signal 3 (Digital I/O input)	I	B
12	Digital I/O ST4	Script selection signal 4 (Digital I/O input)	I	B
7	Digital I/O ST5	Script selection signal 5 (Digital I/O input)	I	B
8	Digital I/O ST6	Script selection signal 6 (Digital I/O input)	I	B
9	Digital I/O ST7	Script selection signal 7 (Digital I/O input)	I	B
13	Digital I/O IN0	Digital I/O input signal 0	I	B
14	Digital I/O IN1	Digital I/O input signal 1	I	B
15	Digital I/O IN2	Digital I/O input signal 2	I	B
16	Digital I/O IN3	Digital I/O input signal 3	I	B
28	Digital I/O IN4	Digital I/O input signal 4	I	B
6	Digital I/O OUT0	Digital I/O output signal 0	O	A
21	Digital I/O OUT1	Digital I/O output signal 1	O	A
22	Digital I/O OUT2	Digital I/O output signal 2	O	A
23	Digital I/O OUT3	Digital I/O output signal 3	O	A
24	Digital I/O OUT4	Digital I/O output signal 4	O	A
32	STEP	Step execution input signal	I	B
33	START	Script signal loading trigger input signal	I	B
17, 25, 26	Reserved		-	-

[Type A]



[Type B]



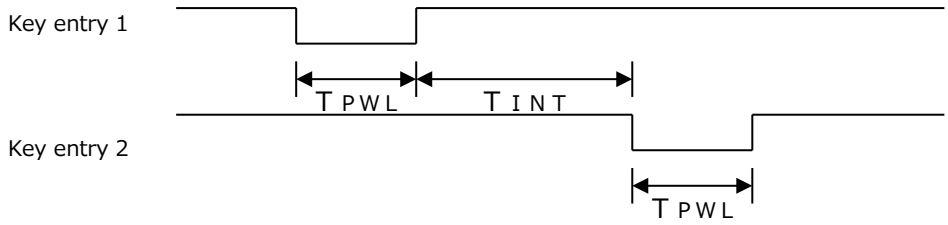
[Connection of output signal]
Use it by connecting to devices controlled by current drive, such as relay control or LED.

You can also use it by connecting to devices for current sink output like [Type B].

[Connection of input signal]
Use it by connecting to devices which can be controlled by current drive, like devices having a switch or transistor output.

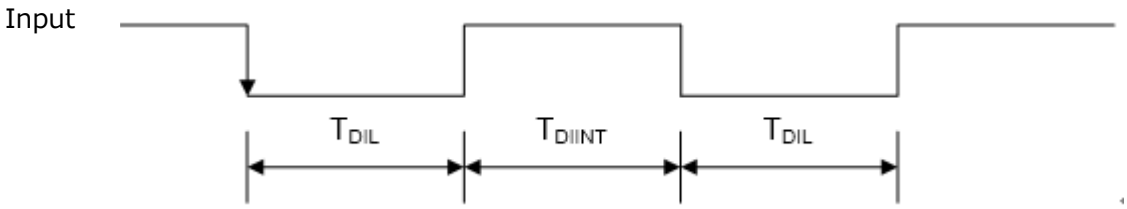
- **Timing Specifications**

[EXT1, EXT2]



	Minimum	Max
T PWL	30 ms	200 ms
T INT	30 ms	∞

[Digital I/O INx, Digital I/O STx, STEP, START]



	Minimum	Max
TDIL	1 to 256 ms (*1)	∞
TDINT	1 to 256 ms (*1)	∞

(*1) Changeable by a filter setting

- **Electrical Characteristics**

<Digital I/O output（Type A）>

Item	Specifications
Output	MOST FET output (sink type)
Common	8 points/common
Insulation	Photocoupler insulation
Rated load voltage	12-24V DC
Range of usable load voltage	10.2 to 26.4V DC
Max. load current	0.1A/point, 0.5A/Common
Operation at failure	Power off
External power supply	24V DC, 50mA
Range of the external power supply voltage	10.2 to 26.4V DC

<Digital I/O output（Type B)>

Item		Specifications
Input format		DC voltage (Plus common)
Common		16 points/common
Insulation		Photocoupler insulation
Rated input voltage		12-24V DC
Range of usable voltage		10.2 to 26.4V DC
Rated input current		4.1mA/point (24V DC)
Input impedance		5.9kΩ
Operation voltage/current	ON	More than 8.0V DC/ more than 1.3mA
	OFF	Less than 2.9V DC/ less than 0.3mA
Response time	OFF → ON	40μs
	ON → OFF	500μs
Input filter setting		1 to 256ms

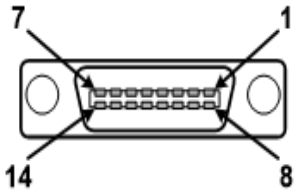
NOTE

If you use NETIMPRESS avant with noise sensitive devices, check the actual waveform. Please take adequate actions like shorten the cable or insert a noise filter if needed.

4.2.5. BCR interface

Item	Specifications	
BCR Connector	Type	HDR-EA14LFYPG1-SLG+ (Honda Tsushin Kogyo Co.,Ltd.)
	Lock screw	HDRA-E68LFD-7F
	Number of port	1

- **Connector type**



HDR-EA14LFYPG1-SLG+
(Honda Tsushin Kogyo Co., Ltd.)

- **Pin assignment**

Pin No.	Signal Name	Definition	I/O
1	VCC	Output 5 V (Max. 500mA for 1 and 6 pin together)	OUT
2	GND	GND	-
3	RSV	-	-
4	RSV	-	OUT
5	RXD	Receive input for communication	IN
6	VCC	Output 5 V (Max. 500mA for 1 and 6 pin together)	OUT
7	RSV	-	-
8	RSV	-	-
9	RSV	-	-
10	NC	NC	-
11	NC	NC	-
12	NC	NC	-
13	GND	GND	-
14	GND	GND	-

- **Electrical Characteristics**

Signal Types	DC Characteristics	AC Characteristics
OUT	VOHmin: 5V VOLmax: -5V	slew rate 30V/μsec or less
IN	VIHmin: +3V VILmax: -3V	

4.3. Compliant standards

Item	Specifications
Safety standard	Compliant standards EN61010-1
Emission	Compliant standards EN61326-1 class A KN11 KN 61000-6-2
Immunity	Compliant standards EN61326-1 Table2 (For use in industrial locations)
RoHS	Compliant standards EN 50581 : 2012

4.4. Storage

Item	Specifications	
SD card	Capacity	SDHC
	Form	Full-size SD
	Interface	UHS- I
	Number of port	1
	Maximum number of	2048

Make sure to use SD card provided by DTS INSIGHT Corporation.

5. Accessory (Optional)

Following table shows optional accessories. For inquiry for accessories, please contact your distributor or DTS INSIGHT Corporation.

Item	Model name	Overview
The SD card for NETIMPRESS avant	AFM700/xxG	SD card for AFX100 (4GB and 32GB available) The SD card which contains programming firm data for microcomputer. Programming for each device can be supported by inserting the SD card into NETIMPRESS avant. You can expand the supported communication protocols by adding a license. SD card is empty with factory setting. Please make sure to add a license before operation. For how to add a license, see the NETIMPRESS avant startup Manual. For microcomputer which is same series as the MCU supported by one license, it can be supported by adding a Micom-pack provided by DTS INSIGHT Corporation. For details of Micom-pack, see the NETIMPRESS avant startup Manual. If you use other SD cards, NETIMPRESS avant cannot work.
Definition license	FxX8xx	License according to the definition license you use is required.
Probe hardware	PHX4xx	Probe for AFX100
Probe logic license	PLX4xx	License according to each communication is required.
Option cable	OCX1xx	Each cable for power supply,BCR,DIO
Accessory	ACX100	Cover for SD card,

5.1. SD card for NETIMPRESS avant

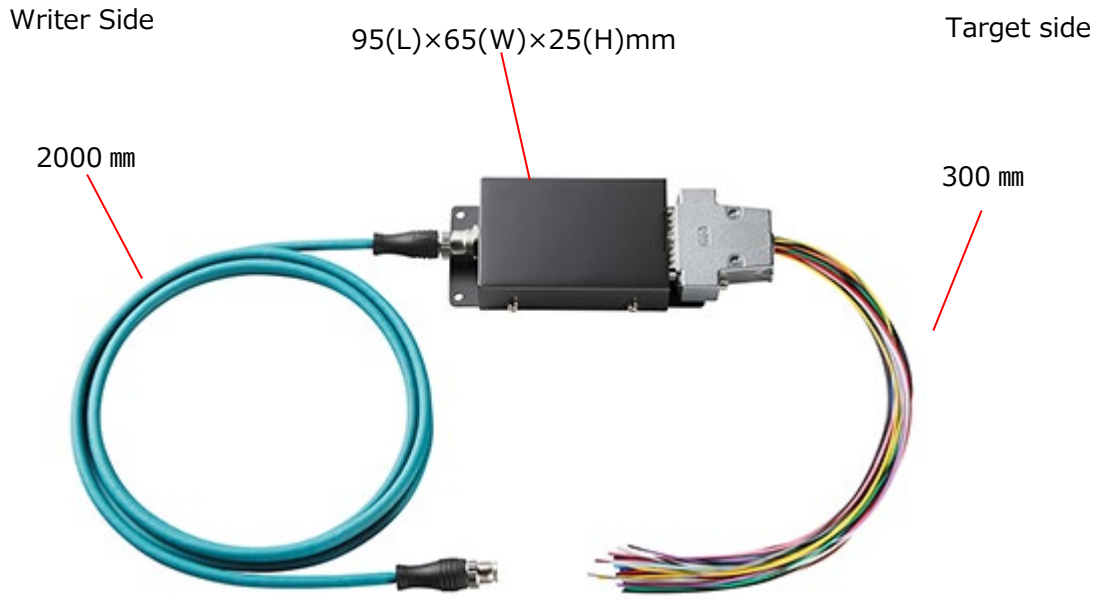
5.1.1. AFM700

型名	概要
AFM700/4G	Dedicated SD card(4GB)
AFM700/32G	Dedicated SD card(32GB)

5.2. PROBE HARD

5.2.1. PHX400

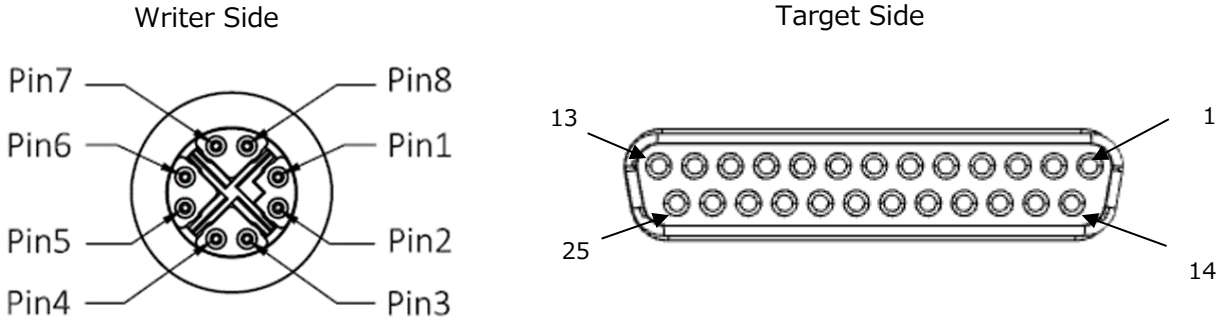
Dimensional drawing



Ground Terminal

Recommended screw size: M4 x 3mm + (thickness of the plain washer)

Connector Detail



Signal description (Probe Connector)

pin No	Signal Name	definition	I/O
1	RX1+	Received data 1 + Input	I
2	RX1-	Received data 1 - Input	I
3	TX1+	Send data 1 + Output	O
4	TX1-	Send data 1 - Output	O
5	Reserved	Reserved signal line	-
6	Reserved	Reserved signal line	-
7	PWR	Power	O
8	GND	GND	-

Signal description (Serial communication)

Below shows description of I/O signal from target side during CSI/UART I/O communication ("I/O" means input and output direction from view of probe side.)

Signal Name	Serial Mode	Meaning	I/O	Type
IO1	TCK	Clock output for clock synchronous communication	O	G
IO2	TTXD	Transmitted data output for serial communication	O(I/O)	A
IO3	TRXD	Received data input for serial communication	I(I/O)	A
IO4	TBUSY	BUSY input	I(I/O)	A
IO5	TAUX	I/O terminal (definition varies according to definition program)	I/O	A
IO6	TAUX2	I/O terminal (definition varies according to definition program)	I/O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1 /TRES,WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Signal description (JTAG communication)

Below shows description of I/O signal from target side during JTAG communication ("I/O" means input and output direction from view of probe side.)

Signal Name	JTAG Mode	Meaning	I/O	Type
IO1	TCK	TCK output of JTAG	O	G
IO2	TDI	Transmitted data output of JTAG	O(I/O)	A
IO3	TDO	Received data input of JTAG	I(I/O)	A
IO4	TMS	TMS output of JTAG	O(I/O)	A
IO5	nTRST	nTRES output of JTAG	O(I/O)	A
IO6	TAUX2	I/O terminal (definition varies according to definition program)	I/O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1 /TRES, WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Signal description (QSPI communication)

Below shows description of I/O signal from target side during QSPI communication ("I/O" means input and output direction from view of probe side.)

Signal Name	QSPI Mode	Meaning	I/O	Type
IO1	SCK	SCK output of SPI	O	G
IO2	SI/IO0	Transmitted data output of SPI	O	A
		Input / output in dual or quad modes	I/O	
IO3	SO/IO1	Received data input of SPI	I	A
		Input / output in dual or quad modes	I/O	
IO4	WP#/IO2	WP output of negative logic SPI	O	A
		Input / output in dual or quad modes	I/O	
IO5	HOLD#/IO3	HOLD output of negative logic SPI	O	A
		Input / output in dual or quad modes	I/O	
IO6	CS#	chip select output of negative logic	O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1 /TRES, WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Signal description (SWD communication)

Below shows description of I/O signal from target side during SWD communication

("I/O" means input and output direction from view of probe side.)

Signal Name	SWD Mode	Meaning	I/O	Type
IO1	SWCLK	SWD CLK output	O	G
IO2	SWDIO	SWD data input / output	I/O	A
IO3	IO3	I/O terminal (definition varies according to definition program)	I/O	A
IO4	IO4	I/O terminal (definition varies according to definition program)	I/O	A
IO5	IO5	I/O terminal (definition varies according to definition program)	I/O	A
IO6	TAUX2	I/O terminal (definition varies according to definition program)	I/O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1 /TRES, WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Signal description (BDM communication)

Below shows description of I/O signal from target side during BDM communication ("I/O" means input and output direction from view of probe side.)

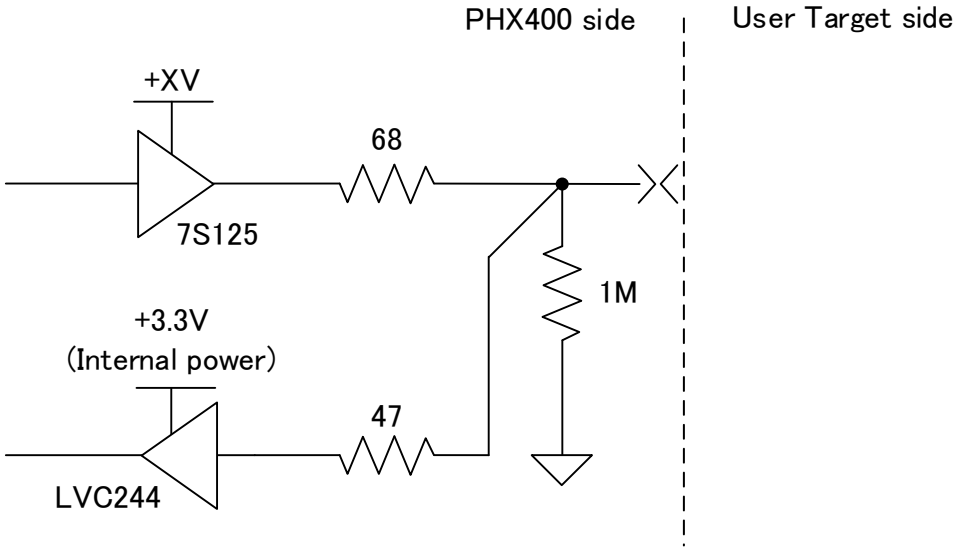
Signal Name	SWD Mode	Meaning	I/O	Type
IO1	IO1	I/O terminal (definition varies according to definition program)	I/O	G
IO2	BKGD	BDM data input / output	I/O	A
IO3	IO3	I/O terminal (definition varies according to definition program)	I/O	A
IO4	IO4	I/O terminal (definition varies according to definition program)	I/O	A
IO5	IO5	I/O terminal (definition varies according to definition program)	I/O	A
IO6	TAUX2	I/O terminal (definition varies according to definition program)	I/O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1 /TRES, WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Interface circuit specification

[Type A]



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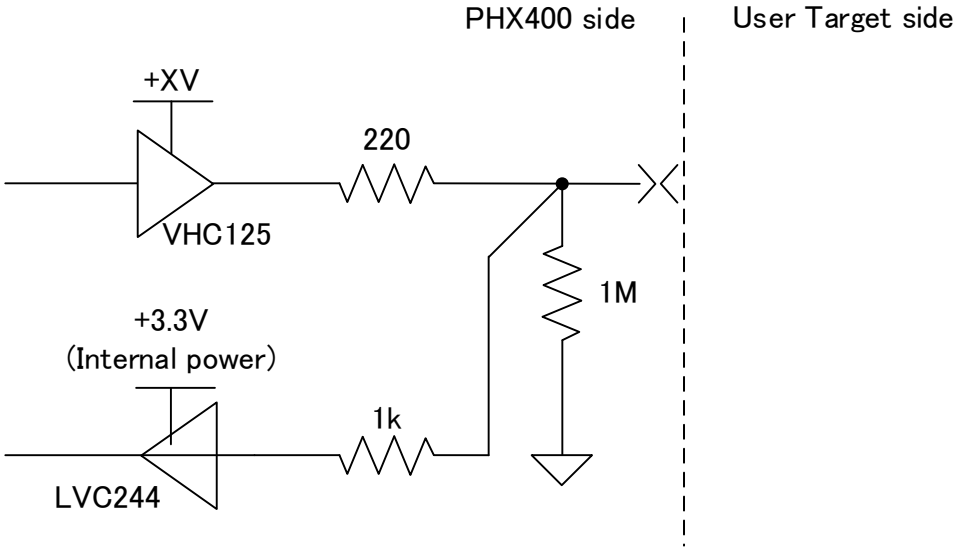

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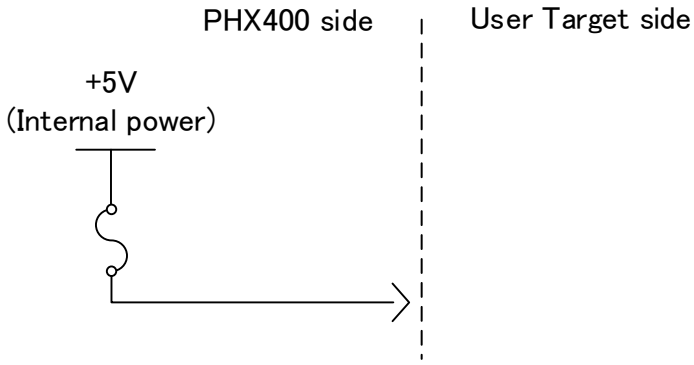

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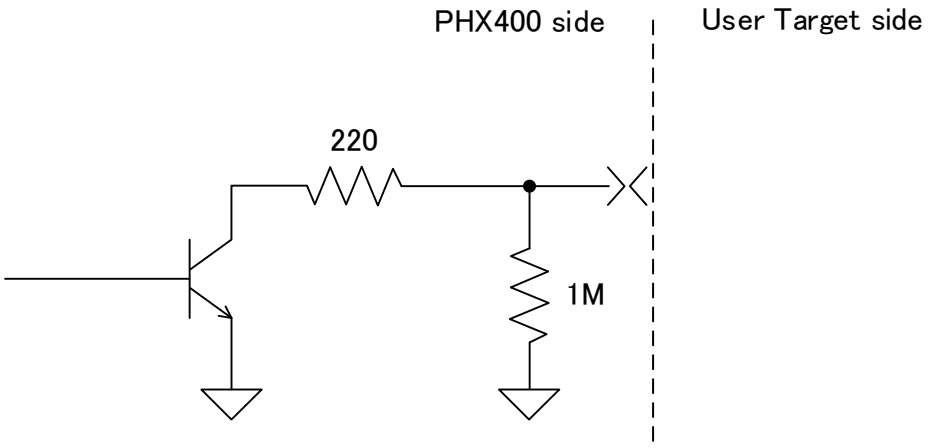
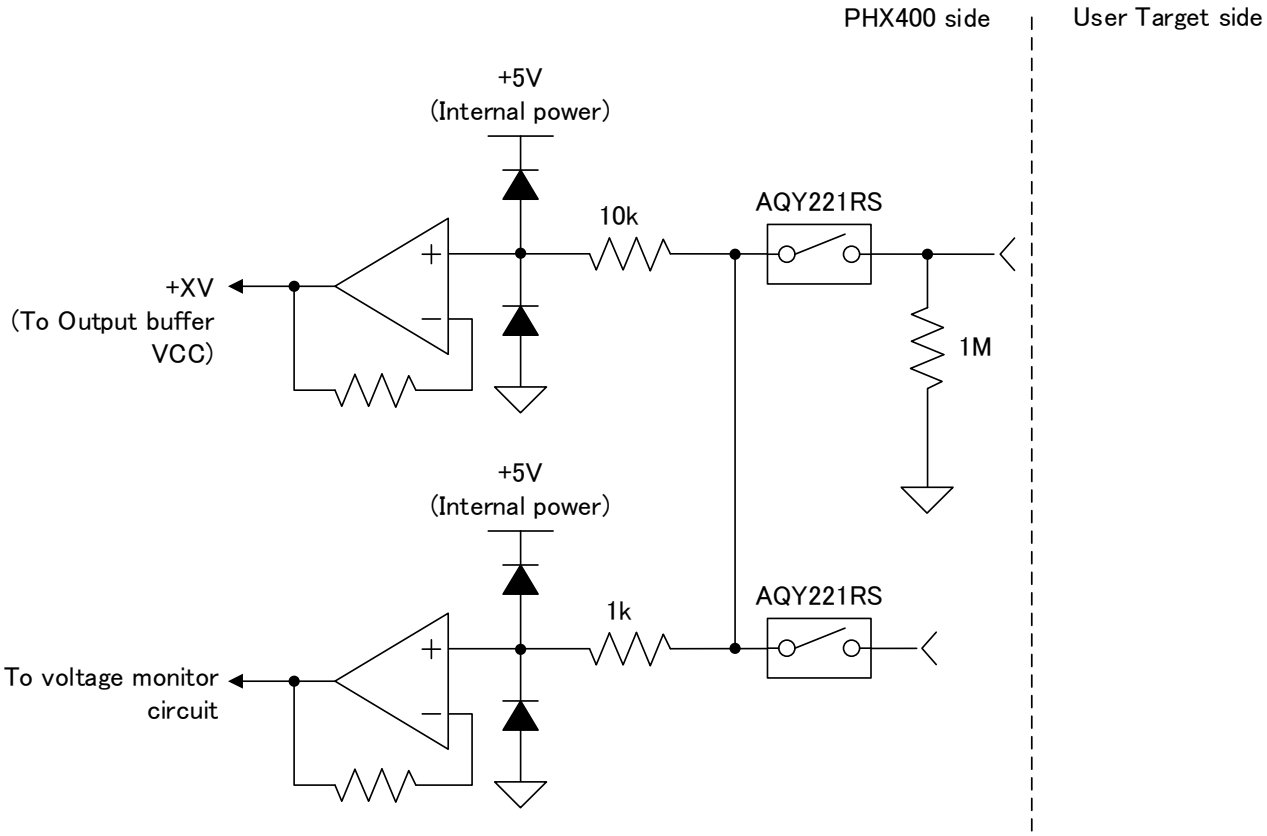
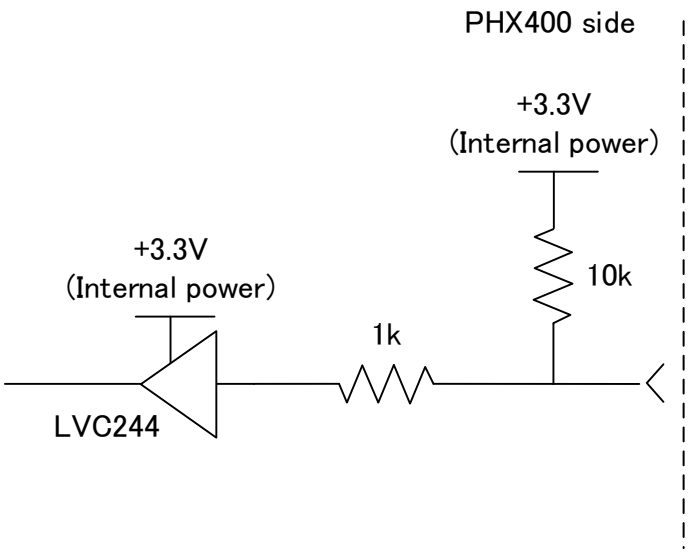

PHX400 side
User Target side
220
1M

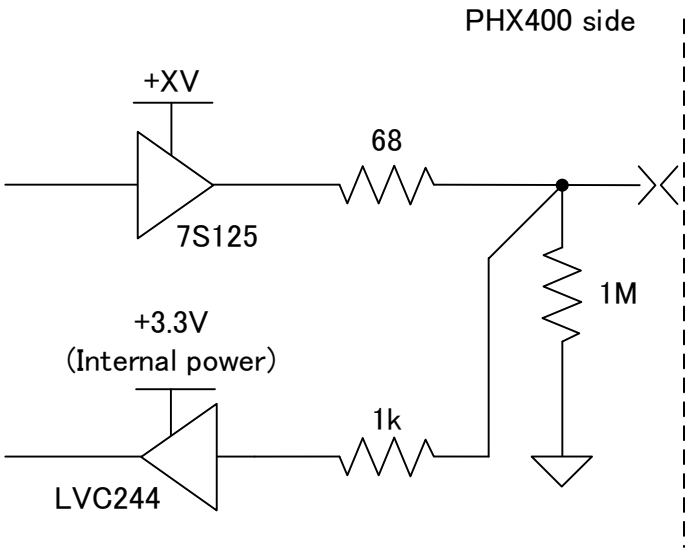
[Type E]


PHX400 side
User Target side
+5V
(Internal power)
10k
AQY221RS
+XV
(To Output buffer
VCC)
1M
+5V
(Internal power)
1k
AQY221RS
To voltage monitor
circuit

[Type F]


PHX400 side
User Target side
+3.3V
(Internal power)
10k
+3.3V
(Internal power)
1k
LVC244

[Type G]


PHX400 side
User Target side
+XV
68
7S125
1M
+3.3V
(Internal power)
1k
LVC244

- **Pin assignment**

Pin No	I/O	Signal Name					Circuit Type	lead color
		Serial mode	JTAG mode	QSPI mode	SWD mode	BDM mode		
1	O	TCK	TCK	SCK	SWCLK	IO1	G	white
14	-	GND					-	white/black
2	I/O	TTXD	TDI	SI/IO0	SWDIO	BKGD	A	red
15	-	GND					-	red/black
3	I/O	TRXD	TDO	SO/IO1	IO3	IO3	A	green
16	-	GND					-	green/black
4	I/O	TBUSY	TMS	WP#/IO2	IO4	IO4	A	yellow
17	-	GND					-	yellow/black
5	I/O	TAUX	nTRST	HOLD#/IO3	IO5	IO5	A	brown
18	-	GND					-	brown/black
6	I/O	TAUX2	TAUX2	CS#	TAUX2	TAUX2	A	blue
19	-	GND					-	blue/black
7	I/O	TAUX3					A	orange
20	-	GND					-	orange/black
8	I/O	TAUX4					B	grey
21	I/O	TMODE					B	grey/black
9	O	VCC					C	purple
22	-	GND					-	purple/black
10	I/O	/TICS					B	light blue
23	O	/TRES					D	light blue/black
11	-	GND					-	pink/black
24	O	WDT					D	pink
12	-	GND					-	black
25	I	TVccd					E	yellow/green
13	I	PROBE SELECT					F	light blue/white

DC characteristics

Below shows DC characteristics

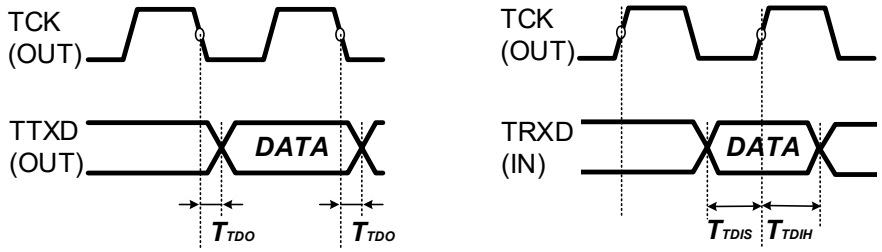
+TV in the table is power source voltage for output buffer which generated from TVccd.

Output voltage fluctuates by voltage drop due to serial resistance in probe and type of input circuit of target system side.

Signal Name	Item				Min	Max	Unit
TVccd	Input voltage	Vin		Maximum absolute rating	-0.3	5.25	V
				Operating range	2.0	5.0	
	Input current	Iin		–	–	300	uA
/TRES	Input voltage	Vin		Maximum absolute rating	–	7.0	V
WDT	Output voltage	VoL	Isink=-3mA	–	–	0.7	V
IO1～IO7	Output voltage	VoH	IoH=-100uA	+XV=2.3V	2.2	–	V
				+XV=3.0V	2.9	–	
				+XV=4.5V	4.4	–	
		VoL	IoH=100uA	+XV=2.3V	–	0.1	
				+XV=3.0V	–	0.1	
				+XV=4.5V	–	0.1	
	Output current	Iout		+XV=2.3V	–	±8	mA
				+XV=3V	–	±24	
				+XV=4.5V	–	±32	
	Input voltage	Vin		Maximum absolute rating	-0.3	5.25	V
		ViH		–	2.0	–	
		ViL		–	–	0.8	
	Input current	Iin		–	–	12	uA
IO8～IO10	Output voltage	VoH	IoH=-50uA	+XV=2.0V	1.9	–	V
				+XV=3.0V	2.9	–	
				+XV=4.5V	4.4	–	
		VoL	IoH=50uA	+XV=2.3V	–	0.1	
				+XV=3.0V	–	0.1	
				+XV=4.5V	–	0.1	
	Output current	Iout		+XV=2.3V	–	±8	mA
				+XV=3V	–	±24	
				+XV=4.5V	–	±32	
	Input voltage	Vin		Maximum absolute rating	-0.3	5.25	V
		ViH		–	2.0	–	
		ViL		–	–	0.8	
	Input current	Iin		–	–	12	uA

*/TRES、WDT are open collector output.

AC characteristic



Parameter	Item	Criteria	Condition
T_{TDO}	TTXD output delay time when TCK is falling.	Max. 6ns	This does not depend on the baud rate settings
T_{TDIS}	TRXD setup time when TCK is rising.	Min. 0ns	This does not depend on the baud rate settings
T_{TDIH}	TRXD hold time when TCK is rising.	Min. 12.5ns	This does not depend on the baud rate settings

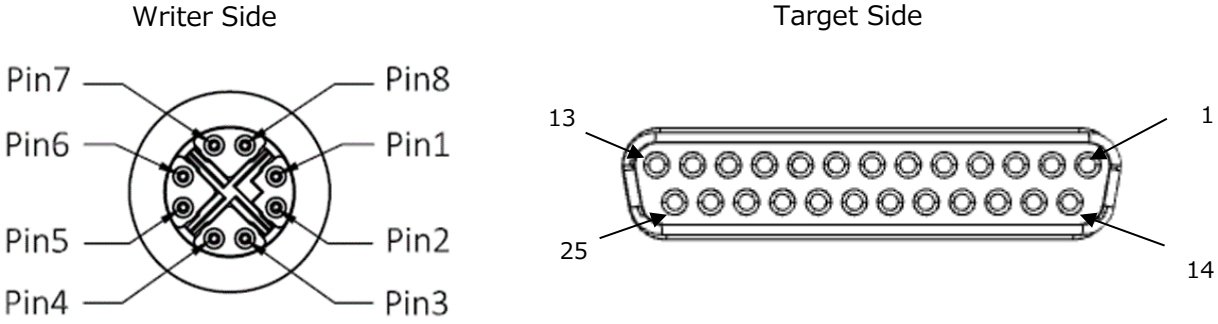
5.2.2. PHX401

Dimensional drawing

Ground Terminal

*Recommended screw size: M4 x 3mm + (thickness of the plain washer)

Connector Detail



Signal description (Probe Connector)

pin No	Signal Name	definition	I/O
1	RX1+	Received data 1 + Input	I
2	RX1-	Received data 1 - Input	I
3	TX1+	Send data 1 + Output	O
4	TX1-	Send data 1 - Output	O
5	Reserved	Reserved signal line	-
6	Reserved	Reserved signal line	-
7	PWR	Power	O
8	GND	GND	-

Signal description（QSPI communication）

Below shows description of I/O signal from target side during serial (QSPI) communication

（”I/O” means input and output direction from view of probe side.）

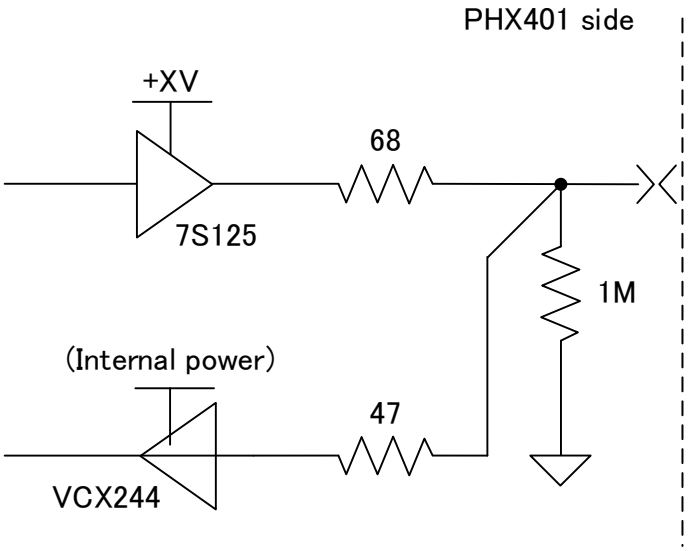
Signal Name	QSPI Mode	Meaning	I/O	Type
IO1	SCK	SCK output of SPI	O	G
IO2	SI/IO0	Send data output of SPI	O	A
		Input / output in dual or Quad modes	I/O	
IO3	SO/IO1	Received data input of SPI	I	A
		Input / output in dual or Quad mode	I/O	
IO4	WP#/IO2	WP output of negative logic SPI	O	A
		Input / output in Quad mode	I/O	
IO5	HOLD#/IO3	HOLD output of negative logic SPI	O	A
		Input / output in Quad mode	I/O	
IO6	CS#	Chip select output of negative logic	O	A
IO7	TAUX3	I/O terminal (definition varies according to definition program)	I/O	A
IO8	TAUX4	I/O terminal (definition varies according to definition program)	I/O	B
IO9	TMODE	I/O terminal (definition varies according to definition program)	I/O	B
IO10	/TICS	I/O terminal (definition varies according to definition program)	I/O	B
VCC		5V output (MAX 100mA)	O	C
/TRES		Re-set output of negative logic (open collector output) (*1)	O	D
WDT		Watchdog timer output (open collector output) (*1)	O	D
TVccd		User power input (driver power for I/F)	I	E
PROBE SELECT		Terminal selection signal of target probe	I	F
GND		GND	–	–

*1　/TRES,WDT are open collector signal with 1MΩ pull down.

Please note that no voltage output to target side.

Interface circuit specification

[Type A]



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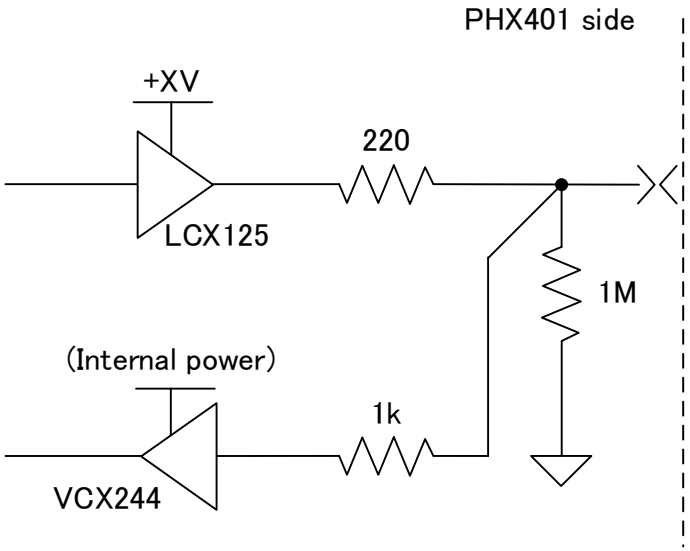

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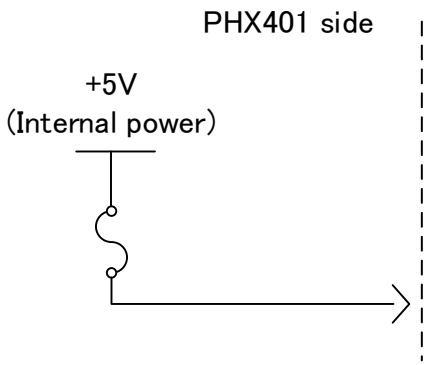

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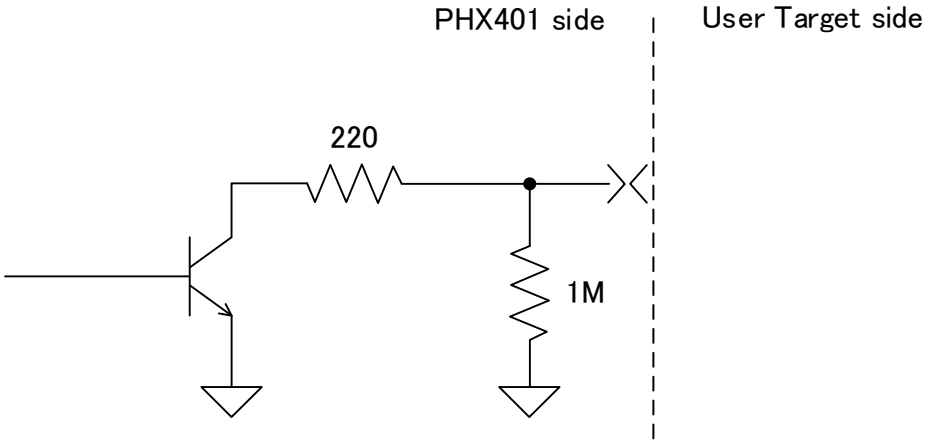
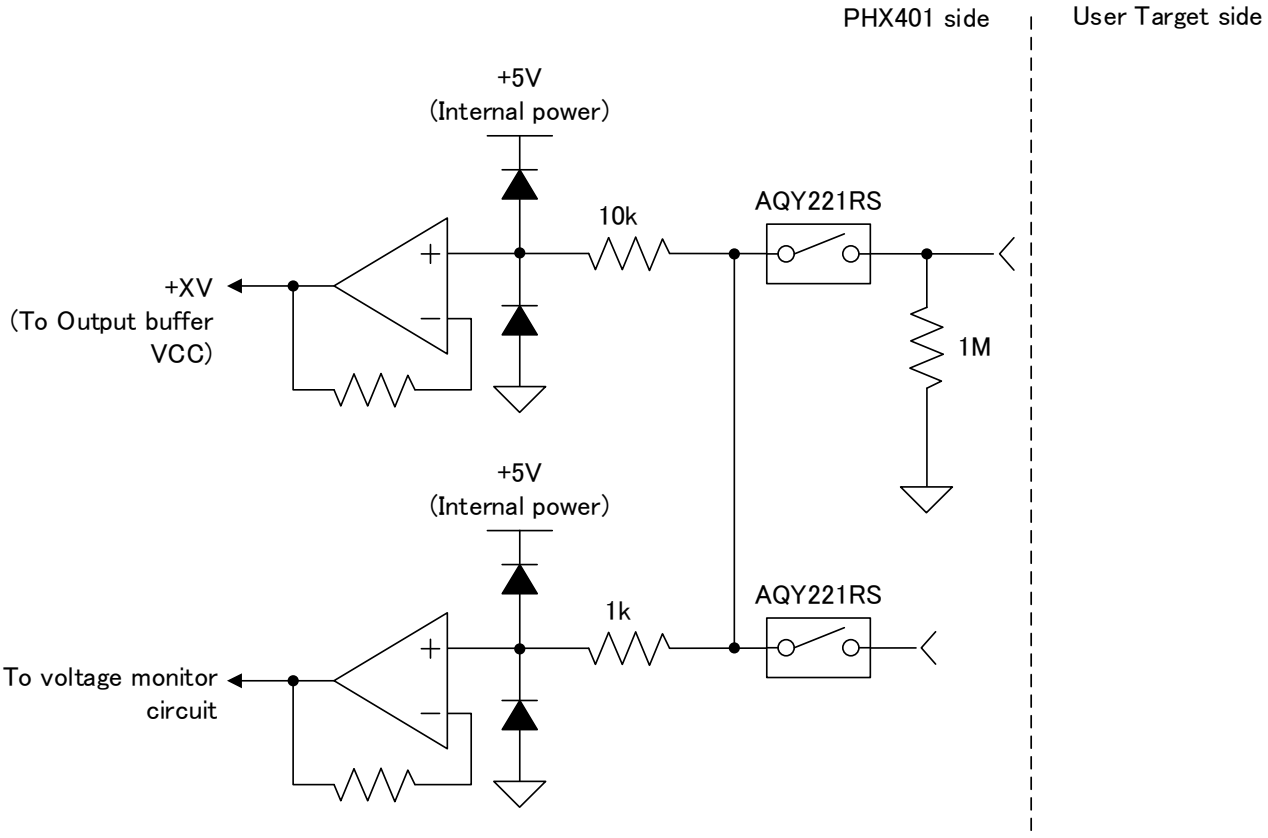
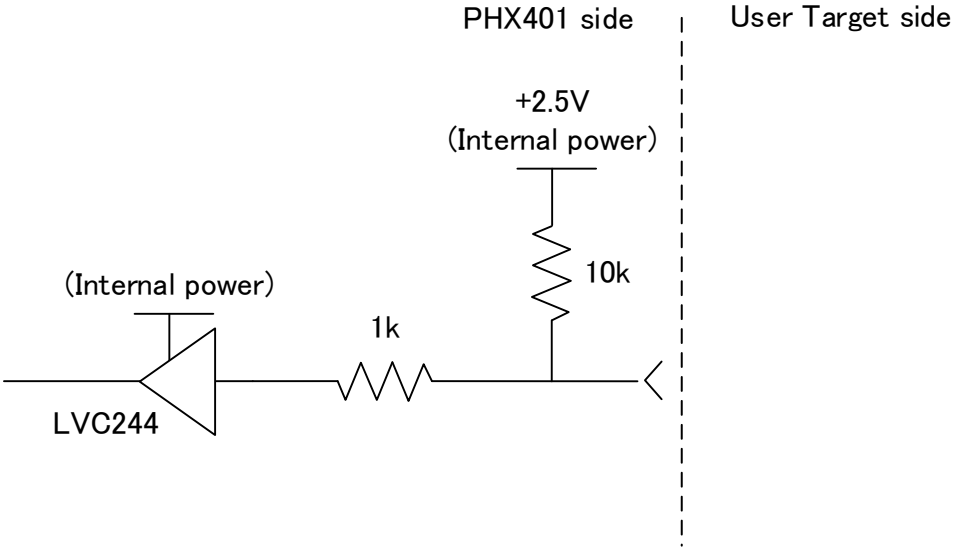

PHX401 side
User Target side
220
1M

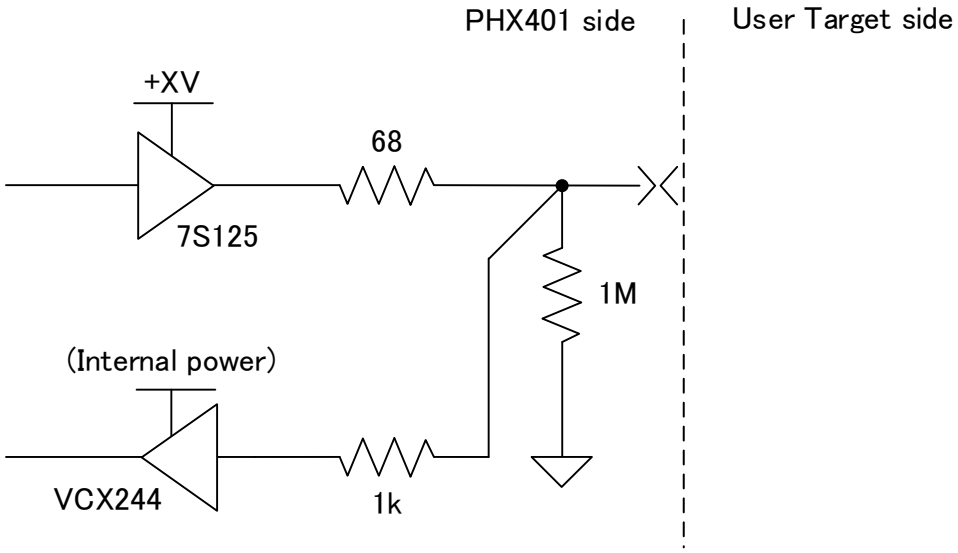
[Type E]


PHX401 side
User Target side
+5V
(Internal power)
10k
AQY221RS
+XV
(To Output buffer
VCC)
1M
+5V
(Internal power)
1k
AQY221RS
To voltage monitor
circuit

[Type F]


PHX401 side
User Target side
+2.5V
(Internal power)
10k
(Internal power)
1k
LVC244

[Type G]


PHX401 side
User Target side
+XV
68
7S125
1M
(Internal power)
VCX244
1k

Pin assignment

Pin No	I/O	Signal Name	QSPI mode	Circuit Type	lead color
1	O	IO1	SCK	G	white
14	-	GND		-	white/black
2	I/O	IO2	SI/IO0	A	red
15	-	GND		-	red/black
3	I/O	IO3	SO/IO1	A	green
16	-	GND		-	green/black
4	I/O	IO4	WP#/IO2	A	yellow
17	-	GND		-	yellow/black
5	I/O	IO5	HOLD#/IO3	A	brown
18	-	GND		-	brown/black
6	I/O	IO6	CS#	A	blue
19	-	GND		-	blue/black
7	I/O	IO7	TAUX3	A	orange
20	-	GND		-	orange/black
8	I/O	IO8	TAUX4	B	grey
21	I/O	IO9	TMODE	B	grey/black
9	O	VCC		C	purple
22	-	GND		-	purple
10	I/O	IO10	/TICS	B	light blue
23	O	/TRES		D	light blue/black
11	-	GND		-	pink/black
24	O	WDT		D	pink
12	-	GND		-	black
25	I	TVccd		E	yellow/green
13	I	PROBE SELECT		F	light blue/white

DC characteristics

Below shows DC characteristics

+TV in the table is power source voltage for output buffer which generated from TVccd.

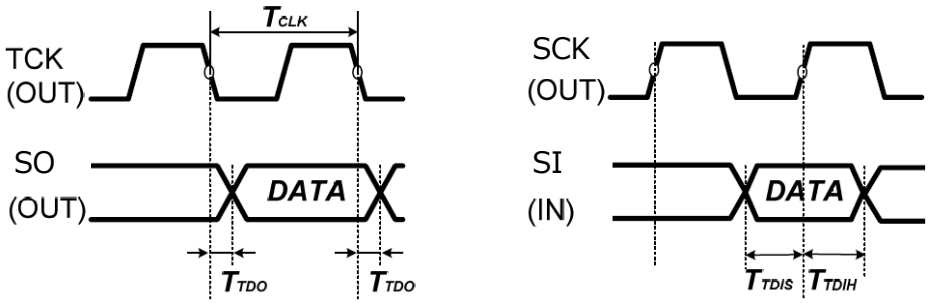
Output voltage fluctuates by voltage drop due to serial resistance in probe and type of input circuit of target system side.

Signal Name	Item				Min	Max	Unit
TVccd	Input voltage	Vin		Maximum absolute rating	-0.3	3.6	V
				Operating range	1.7	3.3	
	Input current	Iin		–	–	300	uA
/TRES	Input voltage	Vin		Maximum absolute rating	–	4.6	V
WDT	Output voltage	VoL	Isink=-3mA	–	–	0.7	V
IO1～IO7	Output voltage	VoH	IoH=-100uA	+XV=1.8V	1.6	–	V
				+XV=2.3V	2.1	–	
				+XV=3.0V	2.8	–	
		VoL	IoH=100uA	+XV=1.8V	–	0.2	
				+XV=2.3V	–	0.2	
				+XV=3.0V	–	0.2	
	Output current	Iout		+XV=2.3V	–	±8	mA
				+XV=3V	–	±24	
	Input voltage	Vin		Maximum absolute rating	-0.5	4.6	V
		ViH		–	1.5	–	
		ViL		–	–	0.4	
	Input current	Iin		–	–	12	uA
IO8～IO10	Output voltage	VoH	IoH=-100uA	+XV=1.8V	1.6	–	V
				+XV=2.3V	2.1	–	
				+XV=3.0V	2.8	–	
		VoL	IoH=100uA	+XV=1.8V	–	0.2	
				+XV=2.3V	–	0.2	
				+XV=3.0V	–	0.2	
	Output current	Iout		+XV=2.3V	–	±8	mA
				+XV=3V	–	±24	
	Input voltage	Vin		Maximum absolute rating	-0.5	4.6	V
		ViH		–	1.5	–	
		ViL		–	–	0.4	
	Input current	Iin		–	–	12	uA

*/TRES, WDT are open collector output.

AC Characteristics

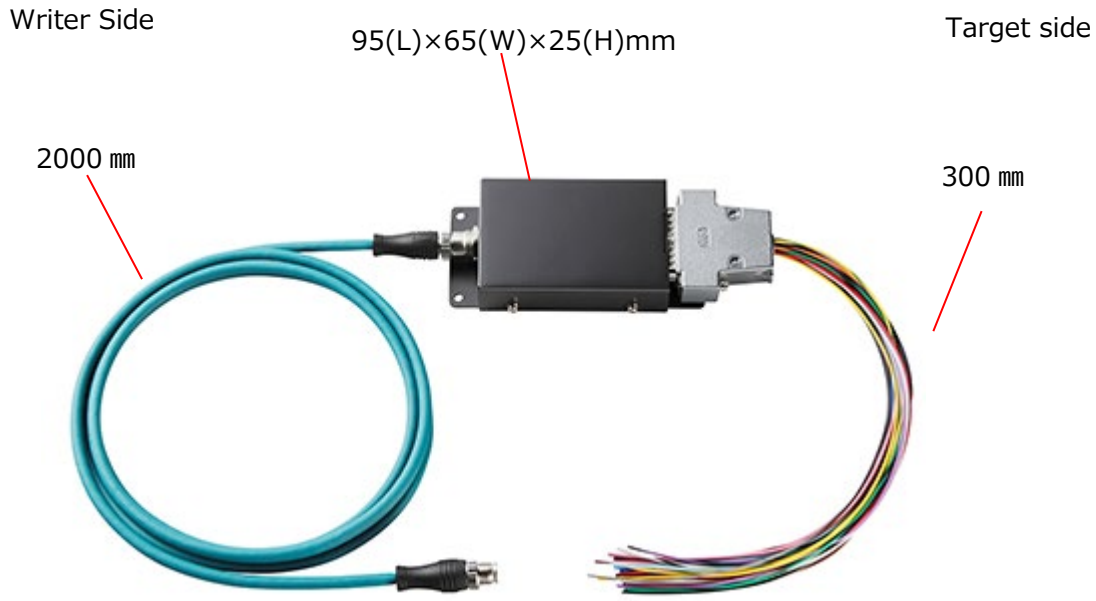
In the case of the target to output when SCK is falling.



Parameter	Item	Criteria	Condition
T_{TDO}	Delay time until SO output when SCK is falling.	Max. 15ns	This does not depend on the baud rate setting. TVCC = 1.8V
T_{CLK}	SCK cycle time	Min. 50ns	SCK = 20MHz
T_{TDIS}	SI setup time when TCK is rising.	Min. 9ns	This does not depend on the baud rate setting.
T_{TDIH}	SI hold time when SCK is rising.	Min. 6ns	This does not depend on the baud rate setting.

5.2.3. PHX410

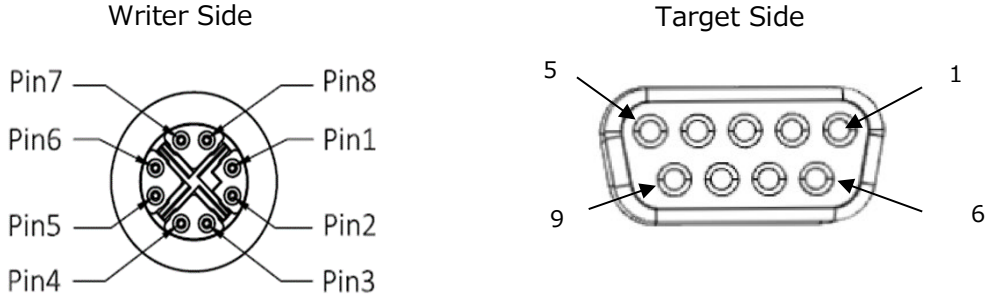
Dimensional drawing



Ground Terminal

*Recommended screw size: M4 x 3mm + (thickness of the plain washer)

Connector Detail



Signal description (Probe Connector)

pin No	Signal Name	definition	I/O
1	RX1+	Received data 1 + Input	I
2	RX1-	Received data 1 - Input	I
3	TX1+	Send data 1 + Output	O
4	TX1-	Send data 1 - Output	O
5	Reserved	Reserved signal line	-
6	Reserved	Reserved signal line	-
7	PWR	Power	O
8	GND	GND	-

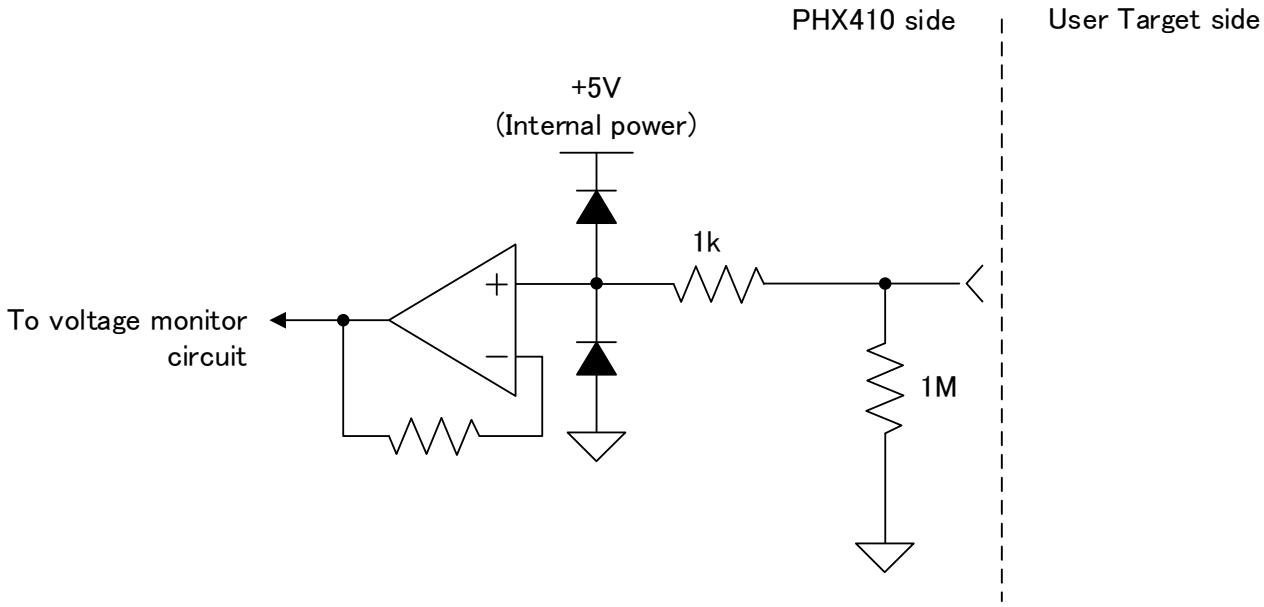
Signal description (CAN communication)

Below shows description of I/O signal from target side during CAN communication ("I/O" means input and output direction from view of probe side.)

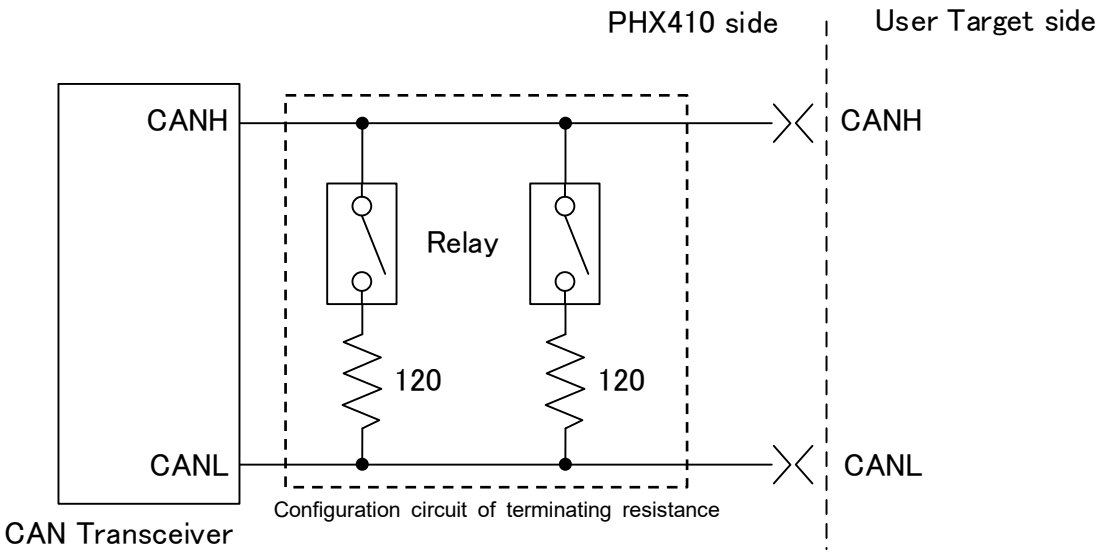
Signal Name	Meaning	I/O	Type
TVCCS	User power monitor input	I	A
CANH	High level signal for CAN communication	I/O	B
CANL	Low level signal for CAN communication	I/O	B
TIO	I/O terminal (definition varies according to definition program)	I/O	C
TMODE	I/O terminal (definition varies according to definition program)	I/O	C
PROBE SELECT	Terminal selection signal of target probe	I	D
Reserve	Reserve signal (do not connect anything from target side)	–	–
GND	GND	–	–

Interface circuit specification

[Type A]

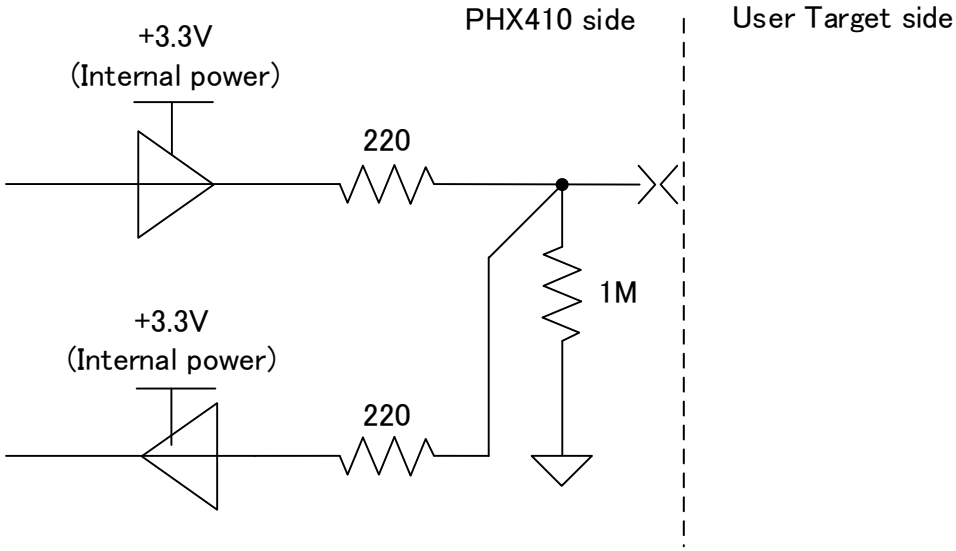


[Type B]

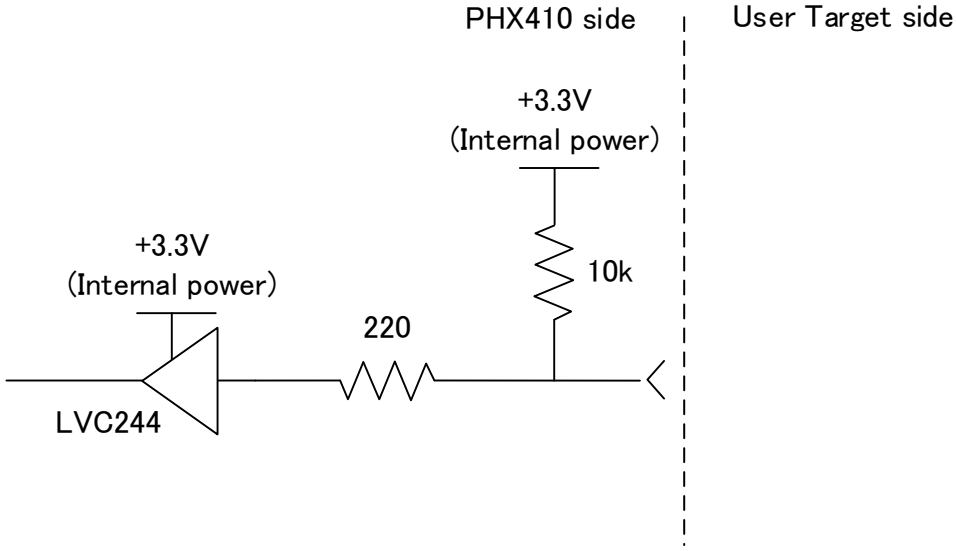


Relay's initial condition is "OFF" ("OPEN" condition: No terminating resistance).

[Type C]


PHX410 side
User Target side
+3.3V
(Internal power)
220
1M
+3.3V
(Internal power)
220

[Type D]


PHX410 side
User Target side
+3.3V
(Internal power)
10k
+3.3V
(Internal power)
220
LVC244

- **Pin assignment**

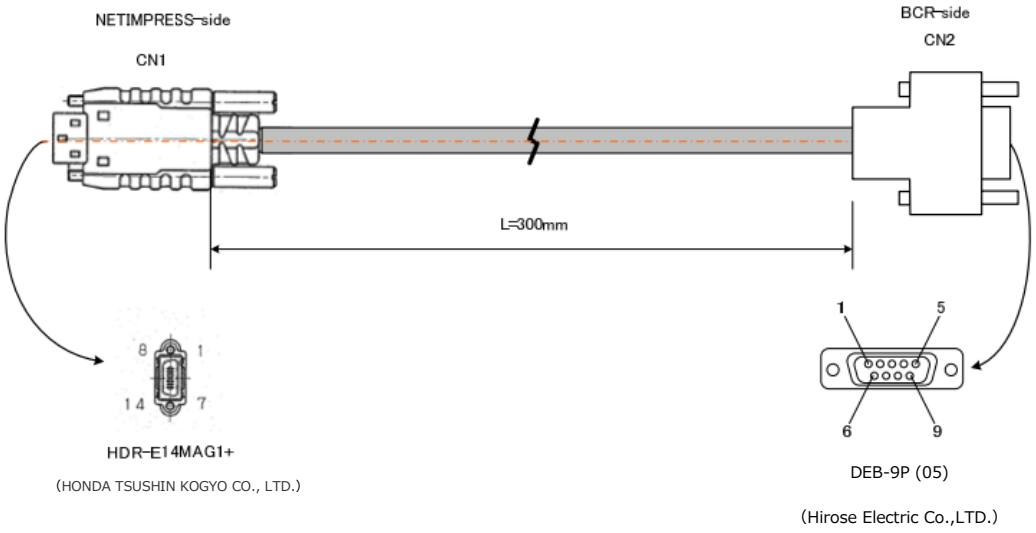
Pin No.	I/O	Signal Name	Circuit Type	lead color
1	I	TVCCS	A	white
2	I/O	CANL	B	red
3	-	GND	-	black
4	-	Reserved	-	blue
5	-	Reserved	-	purple
6	I/O	TIO	C	orange
7	I/O	CANH	B	yellow
8	I/O	TMODE	C	grey
9	I	PROBE SELECT	D	light blue

5.3. Optional cable

5.3.1. OCX100 (AC code available only in Japan)

Cable type differs according to country. For inquiry, please contact your distributor or DTS INSIGHT CORPORATION.

5.3.2. OCX110（BCR CABLE）

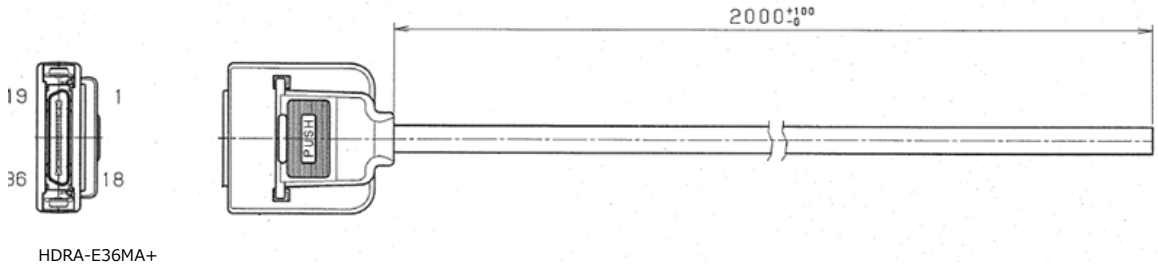


NETIMPRESS-side	
Pin. No	Signal name
1	VCC
8	RSV
2	GND
9	RSV
3	RSV
10	NC
4	RSV
11	NC
5	RXD
12	NC
6	VCC
13	GND
7	RSV
14	GND

BCR-side	
Pin. No	Signal name
1	NC
2	RXD
3	RSV
4	NC
5	GND
6	RSV
7	RSV
8	RSV
9	VCC

5.3.3. OCX120（DIO Cable）

Available for any type of connector.



HDRA-E36MA+

(HONDA TSUSHIN KOGYO CO., LTD.)

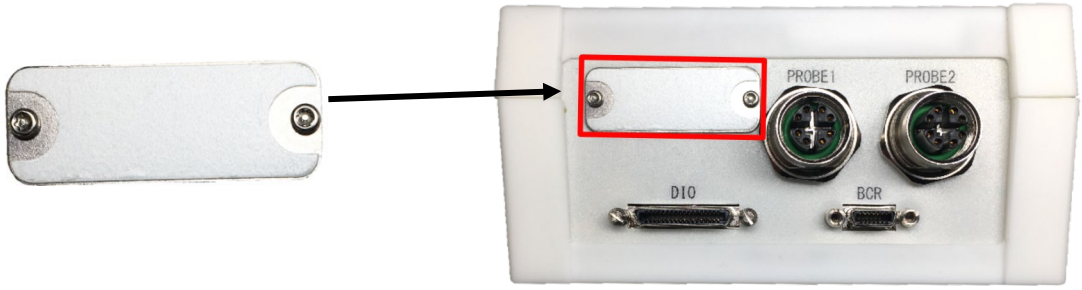
Target-side

Wiring Specification

Pin No.	Pin No.		Signal Name
	Insulator color	Dot Mark	
1	Orange	Red 1 dot	DOCOM
2		Black 1 dot	DOVCC
3	Grey	Red 1 dot	Pass
4		Black 1 dot	Error
5	White	Red 1 dot	RUN
6		Black 1 dot	Digital I/O OUT0
7	Yellow	Red 1 dot	Digital I/O ST5
8		Black 1 dot	Digital I/O ST6
9	Pink	Red 1 dot	Digital I/O ST7
10		Black 1 dot	Digital I/O ST2
11	Orange	Red 2 dots	Digital I/O ST3
12		Black 2 dots	Digital I/O ST4
13	Grey	Red 2 dots	Digital I/O IN0
14		Black 2 dots	Digital I/O IN1
15	White	Red 2 dots	Digital I/O IN2
16		Black 2 dots	Digital I/O IN3
17	Yellow	Red 2 dots	RSV
18		Black 2 dots	DIVCC
19	Pink	Red 2 dots	DOCOM
20		Black 2 dots	DOVCC
21	Orange	Red 3 dots	Digital I/O OUT1
22		Black 3 dots	Digital I/O OUT2
23	Grey	Red 3 dots	Digital I/O OUT3
24		Black 3 dots	Digital I/O OUT4
25	White	Red 3 dots	Rsv
26		Black 3 dots	Rsv
27	Yellow	Red 3 dots	DIVCC
28		Black 3 dots	Digital I/O IN4
29	Pink	Red 3 dots	EXT1
30		Black 3 dots	EXT2
31	Orange	Red 4 dots	CLR
32		Black 4 dots	STEP
33	Grey	Red 4 dots	START
34		Black 4 dots	Digital I/O ST0
35	White	Red 4 dots	Digital I/O ST1
36		Black 4 dots	DIVCC

5.4. Accessary

5.4.1. ACX100（SD card cover）



6. FAQ

Main unit does not work

Check the SD card

If the dedicated SD card is broken, NETIMPRESS avant may repeat the start-up operation. In that case, remove the damaged SD card and replace it to the normal SD card.

7. Contact

For inquiry about the specification of NETIMPRESS avant, please contact our support center. For inquiry about the price information or lead time, please contact our sales or your local distributors.

Contact

NETIMPRESS Support Center

E-mail : support-impress@dts-insight.co.jp

Shinjuku MIDWEST BLDG. 4-30-3 Yoyogi, Shibuya-ku, Tokyo, 151-0053, Japan

NETIMPRESS avant Hardware Manual

DTS INSIGHT CORPORATION

URL: https://www.dts-insight.co.jp/en/support/support_netimpress_avac/

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