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LT Type A->LT-4301TM

Replacement Guidebook

The 1th Edition: June 2013

Preface

This manual introduces the procedures to replace a unit of LT Type A with a unit of LT-4301TM.

Model in use	Replacement model
LT Type A (Color) (GLC150-SC41-XY32S*-24V)	**LT-4301TM (Modular Type DIO)** **(PFXLM4301TADD*)**
LT Type A (Monochrome) (GLC150-BG41-XY32S*-24V)	

* K: Sink Type C: Source Type

Safety Information

HAZARD OF OPERATOR INJURY, OR UNINTENDED EQUIPMENT DAMAGE

Before operating any of these products, be sure to read all related manuals thoroughly.

Failure to follow these instructions can result in death, serious injury or unintended equipment damage.

LT-4301TM Model Name

The LT-4301TM model name partly varies depending on specifications. Before purchasing a product, make sure of a model number for order.

Model Name Indication

P	F	X	L	M	4	3	0	1	T	A	D	D	C
			1		2	3	4		5	6	7	8	9

1	2	3	4	5	6	7	8	9
Model	**Series**	**Size**	**Communication**	**LCD**	**Touch Panel**	**Power**	**DIO**	**Input Type**
LM	4	3: 5.7” 2: 3.5”	01:RS-232C/ RS485	T: TFT	A: Analog	D: DC24V	A: Analog DIO and Digital DIO D: Digital DIO only	C: source output type K: sink output type

Model	Model Name	I/O Specifications	Note
LT-4301TM (Modular Type DIO)	PFXLM4301TADD*	20-point inputs (including 2-point high speed inputs) 12-point outputs (including 2-point high speed outputs)	5.7”QVGA（320x240 pixels）

Contents

Chapter 1 Specification Comparison

1.1 Specifications of LT Type A and LT-4301TM

Functional specifications/General specifications

		LT Type A	LT-4301TM (Modular Type DIO)
			
Display Type	**Color**	STN Color LCD	**UP!**TFT Color LCD
	Monochrome	Blue-mode monochrome LCD	
Display Colors	**Color**	64 colors	**UP!** 65,536 colors
	Monochrome	Blue-mode monochrome 8 levels	
Display Resolution		QVGA(320×240 pixels)	
Panel Cutout Dimensions (mm)		W191.5×H141.5mm	NEW! φ22mm ->See 2.4
External Dimensions (mm)		W207×H157×D75.8mm	W63×H129.4×D76.22
Touch Panel Type		Matrix	**NEW!** Resistive film Analog ->See 2.2
Memory	**Application**	1MB	**UP!** 16MB
	SRAM	96KB	**UP!** 128KB
Rated Voltage		DC24V	
Control Memory	**Program**	128KB	**UP!** 132KB
	SRAM	32KB	**UP!** 128KB
Serial Interface (COM1)		-	**NEW!** RS-232C/485 →See 2.12
Ethernet Interface		-	**NEW!** 10BASE-T/100BASE-TX
DIO Interface	**Sink Type**	DIO 32 points (Sink/Source Input : 16 points/ Sink Output: 16 points)	DIO 32 points (Sink/Source Input: 20 points/Sink Output: 12 points)
	Source Type	DIO 32 points (Sink/Source Input: 16 points/ Source Output: 16 points)	DIO 32 points (Sink/Source Input: 20 points/ Source Output: 12 points)
USB Host Interface	**Type A**	-	**NEW!** ✔→See 2.6
Tool Connector Interface		✔	-
Printer Interface		-	**NEW!** USB →See 2.8.2
Alarm Output		✔	- →See 2.7

DIO Interface (Input) Specifications

	LT Type A	LT-4301TM (Modular Type DIO)
Rated Voltage	DC24V	
Max. Allowable Voltage	DC26.4V	DC30.0V
Input Type	Sink/Source Input	
Rated Current	5mA (24V)	7.83mA (DC24V) (I0 to I1) 5.00mA (DC24V) (I2 to I19)
Input Resistance	4.7kΩ	3.2kΩ (DC24V) (I0 to I1) 4.9kΩ (DC24V) (I2 to I19)
Standard Operating Range	ON voltage:DC21V or more OFF voltage:DC7V or less	ON voltage:DC15V or more OFF voltage:DC5V or less
Input Delay	10ms or less	(OFF->ON)1.5μs/(ON->OFF)1.9μs (I0 to I1) 0.5ms to 20ms (I2 to I19)
Common	1	1 (I0 to I1) 3 (I2 to I19)
Common Structure	16 points /1 common	2 points /1 common (I0 to I1) 18 points /3 common (I2 to I19)
External Connection	40-pin connector (also used for output)	Spring Clamp Terminal Block
Input Points	16	20
Input Signal Indication	LED lights up for each point ON (logical side)	No LED display
Isolation Method	Photo coupler isolation	
External Power Supply	For Signal:DC24V	

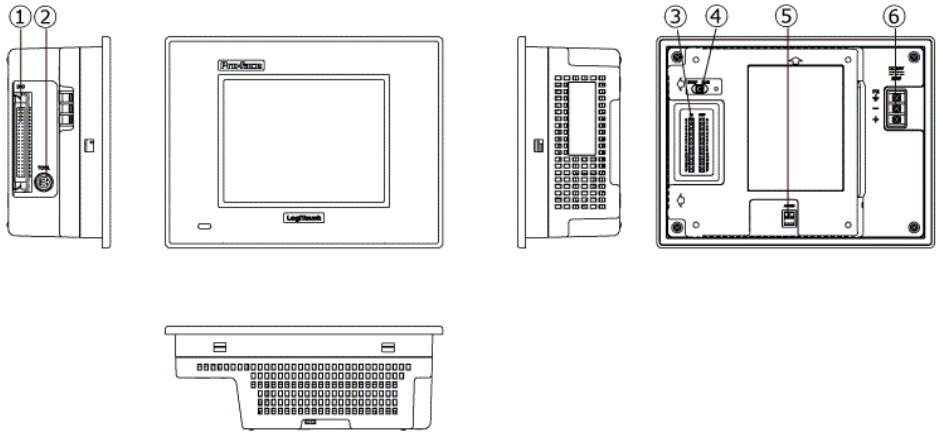
DIO Interface (Output) Specifications

		LT Type A	LT-4301TM (Modular Type DIO)
Rated Voltage		DC24V	
Rated Voltage Range		DC24V±10%	DC19.2 to 28.8V
Output Type	**Sink Type**	Sink Output	
	Source Type	Source Output	
Max. Load Current		0.2A/point, 1.6A/common	**0.3A/point**
Output Voltage Drop		DC2.5V or less	**DC1.5V**
Output Delay		2ms or less	(OFF->ON)30μs/(ON->OFF)0.3ms (Q0 to Q1) (OFF->ON)50μs/(ON->OFF)1.0ms (Q2 to Q11)
Leakage Current When OFF		0.4mA or less	**0.4mA or less**
Output Classification		Transistor Output	MOS-FET (Q0 to Q1) Transistor Output (Q2 to Q11)
Common		1	1 (Q0 to Q1) 2 (Q2 to Q11)
Common Structure		16 points /1 common	2 points/1 common (Q0 to Q1) 10 points /2 commons (Q2 to Q11)
External Connection		40-pin connector (also used for input)	Spring Clamp Terminal Block
Output Protection Classification		Output is unprotected	
Internal Fuse		3.5A, 125V Chip Fuse (non-replaceable)	**2A, 125V Chip Fuse** (non-replaceable)
Surge Suppression Circuit		Diode	**mov**
Output Points		16 points	2 points (Q0 to Q1) 10 points (Q2 to Q11)
Output Signal Indication		LED lights when each point turns ON (logical side)	No LED display
Isolation Method		Photo coupler isolation	
External Power Supply		For Signal: DC24V	

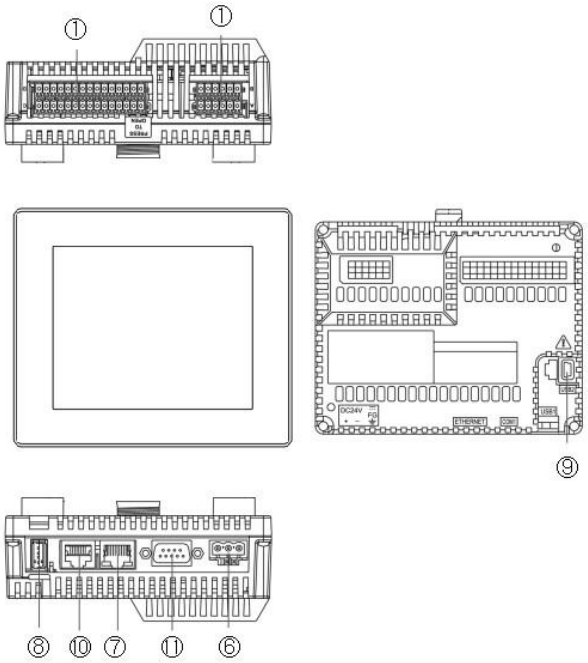
Chapter 2 Compatibility of Hardware

2.1 Locations of connectors

Connector locations on LT Type A and LT-4301TM are as follows;
LT Type A



LT-4301TM



	LT Type A	LT-4301TM
1	DIO I/F	
2	Tool Connector	-
3	DIO Input / Output LED	-
4	RUN/STOP Switch (LED lights when RUN)	-
5	Alarm Output	-
6	Power Input Terminal Block	Power Connector
7	-	Ethernet Interface (10BASE-T/100BASE-TX)
8	-	USB(TypeA) Interface
9	-	USB(mini-B) Interface
10	-	Serial Interface (RS232C/RS485)
11	-	CANopen Interface (Unable to use)

2.2 Touch Panel Specifications

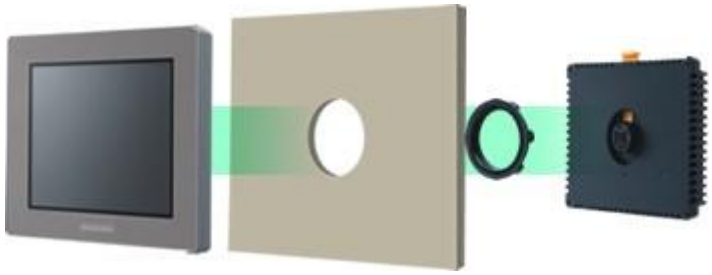
The touch panel type for LT-4301TM is 'Resistive Film (Analog)'.
The resistive film analog type recognizes only the first-touched point, but doesn't recognize the second-touched point when two different points are touched at the same time.
If you have applied the two-point touch input on LT Type A, change it to one-point touch input using the switch delay function of GP-Pro EX.

2.3 Display Colors

LT Type A (monochrome) has a monochrome LCD, but LT-4301TM has a TFT color LCD.
Because of that, black and white display changes to color after replacement. If the Display Unit type's setting has been changed from Monochrome to Color on GP-Pro EX, the display color may be changed to colors other than black and white depending on a setting. After changing the Display Unit type, check the display color of drawings or parts on a screen just in case.

2.4 Panel Cutout Dimensions

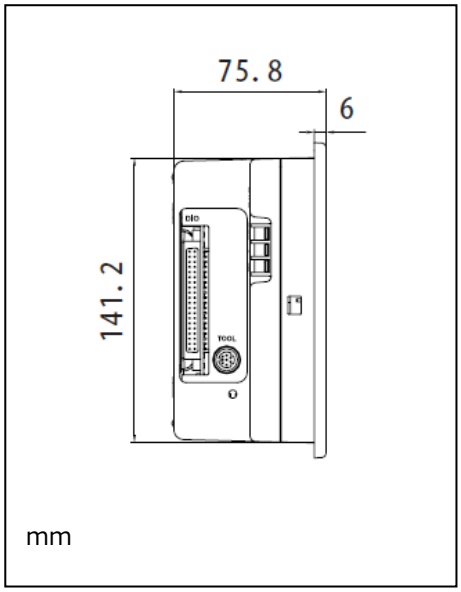
A panel cutout of LT-4301TM is a φ22-mm circular hole and different in shape and size from that of LT Type A.

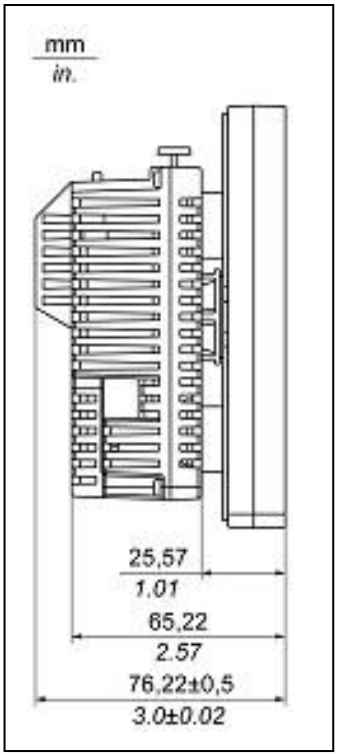


2.5 External Dimensions

Since LT-4301TM is composed of two modules, a display module (front) and a main module (back), its front display part which comes out of the installation panel is thicker than that of LT Type A.

	LT Type A	LT-4301TM
A (front bezel thickness)	6mm	25.57mm
B (back side depth)	69.8mm	50.65mm





2.6 Transfer cable

To transfer screen data to LT-4301TM, use a USB cable or Ethernet.
Use a USB data-transfer cable (model number: ZC9USCBMB1) or a commercial USB cable (USB A/mini-B). Please note that the cables (model number: GPW-CB02, GPW-CB03, GP430-CU02-M) for LT Type A cannot be used for LT-4301TM.

2.7 Interface

Alarm Output Interface
Alarm Output Function is not supported by LT-4301TM. Please note that the Alarm Output that is used for LT Type A cannot be used.

2.8 Peripheral units and options

2.8.1 Barcode reader connection
LT-4301TM is not equipped with a tool port. The barcode reader that was connected to the tool port on LT Type A before replacement cannot be used. But LT-4301TM allows you to connect a barcode reader on its USB interface (Type A).

2.8.2 Printer Connection
LT-4301TM allows you to connect a printer on its USB interface (Type A).

2.9 Power Connector

The power connector on LT-4301TM is a screw lock type. If you replace LT Type A with LT-4301TM, please note that the power supply terminals are different.

2.10 Power Consumption

The power consumption of LT Type A is different from that of LT-4301TM.

LT Type A	20W or less
LT-4301TM	12W or less*

*LT-4301TM (Modular Type DIO)
For the detailed electric specifications, see the hardware manual.

2.11 Materials/Colors of the body

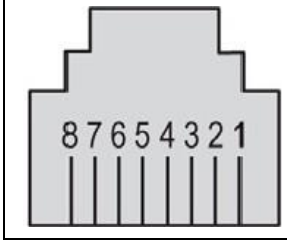
The body material of LT-4301TM (Modular Type DIO) is a resin type. The color is described in the table below.

5.7" display module		
Item	**Specifications**	**Note**
Color (Munsell values)	H=9.8Y V=6.74 C=0.19 PANTON 8401C	

Rear Module		
Item	**Specifications**	**Note**
Color	Pebble gray (RAL7032)	

2.12 Serial Port

- Connector: RJ45 connector
- Insulation: None
- Baud Rate: 300 to 115,200bps
- Transmission Distance (with a shield line): 15m(RS-232C), 200m(RS485)

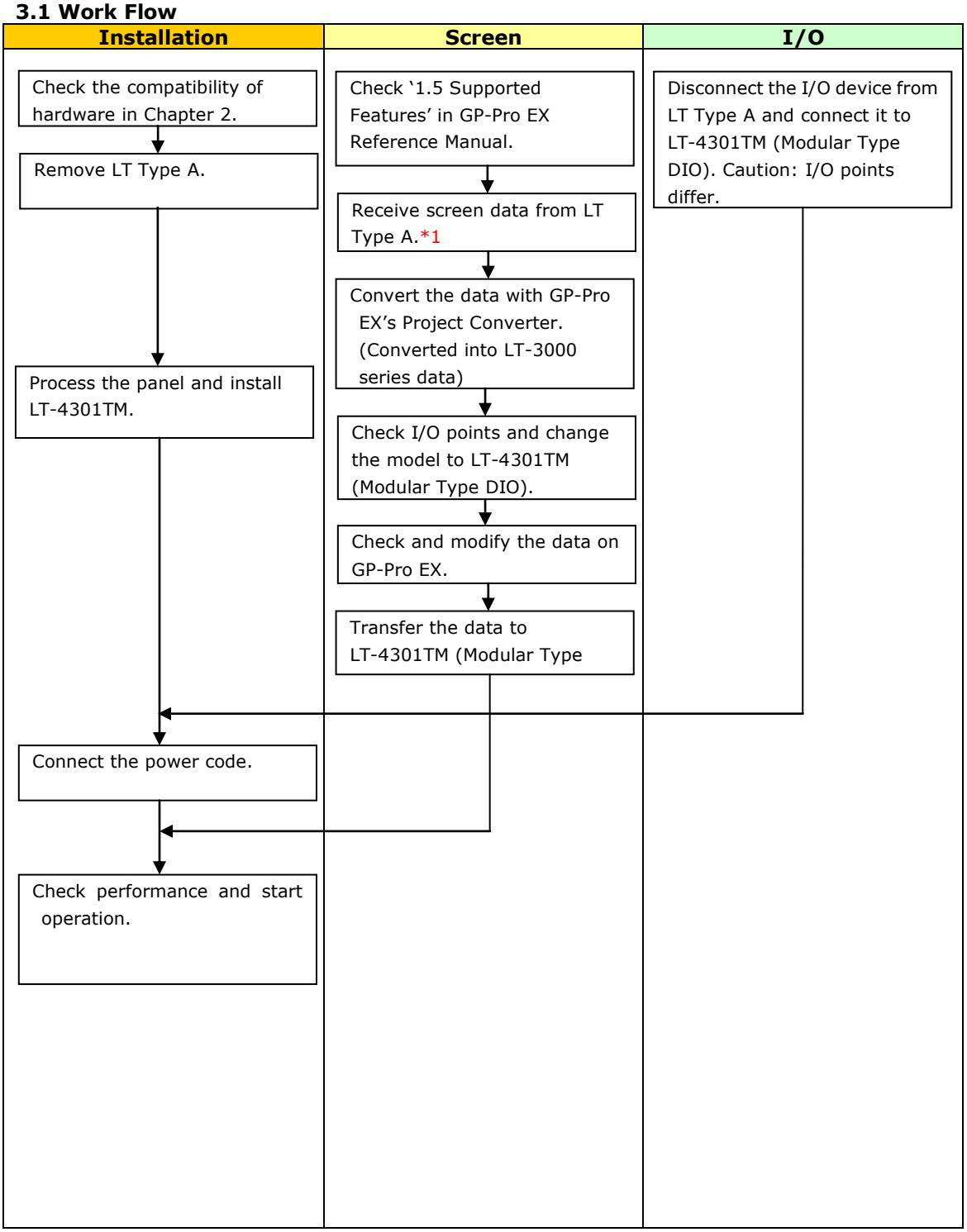
Pin connection	Pin No.	RS-232C Signal name	RS-485 Signal name	Input/ Output	Descriptions
	1	RXD	N.C.	I	Receive data
	2	TXD	N.C.	O	Send data
	3	N.C.	N.C.		Not connected
	4	N.C.	D1	I/O	Differential data+
	5	N.C.	D0	I/O	Differential data-
	6	RTS	RTS	O	Request to send
	7	N.C.	N.C.		Not connected
	8	DC0V	DC0V		DC0V

There's a conversion cable from RJ45 to DSub9, which is an optional item.

(Note) Since there’s no control line, a device unit that requires a control line may not be connected.

Chapter 3 Replacement Procedure

3.1 Work Flow



*1: This step is required if screen data is saved only in the LT unit, not in any other unit.

3.2 Preparation

Requirements for receiving screen data from LT Type A *1	PC in which GP-PRO/PBIII for Windows C-Package03 V7.0 or later is installed. *2
	Transfer cables (the following three types of cables are available.) ・GPW-CB02 (D-sub 9-pin to the PC) ・GPW-CB03 (USB to the PC)*3 ・GP430-CU02-M or GPW-SET (D-sub 25-pin to the PC)
Requirements for converting screen data of LT Type A and transferring the converted data to LT-4301TM	PC in which GP-Pro EX **Ver.3.12 or later** is installed
	A USB transfer cable (model: ZC9USCBMB1) or commercial USB cable (USB A/mini-B) *Also possible to send/receive screen data via a USB storage unit or Ethernet (for LT4X01TM series only)

*1: This step is required if screen data is saved only in the LT unit, not in any other unit.

*2: Please use the same version or later as or than that of the software used during creating screens on LT Type A. If you don't know the version, we recommend you to use the newest version. The newest version is GP-PRO/PBIII for Windows C-Package03 (SP2) V7.29. Those who have GP-PRO/PBIII for Windows C-Package03 V7.0 or later can download it from our web site called [OtasukePro!].(http://www.proface.com/otasuke/).

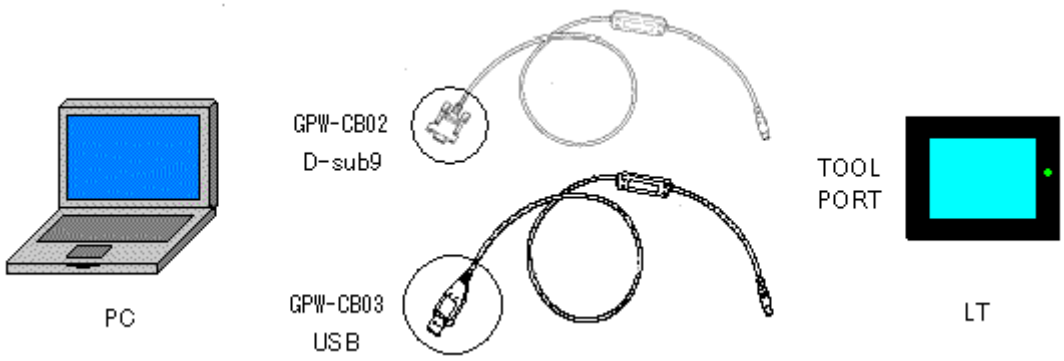
*3: GPW-CB03 is supported by GP-PRO/PBIII for Windows C-Package02 (SP2) V6.23 or later. You need to install a driver from [Download] on our Web site called [OtasukePro!](http://www.proface.com/otasuke/).

3.3 Receive screen data from LT Type A

This section explains, as an example, how to receive screen data from LT Type A using a transfer cable, GPW-CB02 or GPW-CB03. If you have backed up screen data, this step is unnecessary; skip to the next section [3.4 Convert screen data with the Project Converter].

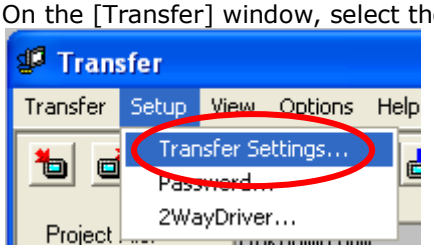
GP-PRO/PBIII for Windows C-Package02 (SP2) is used in the example below.

(1) Connect a transfer cable to LT Type A.

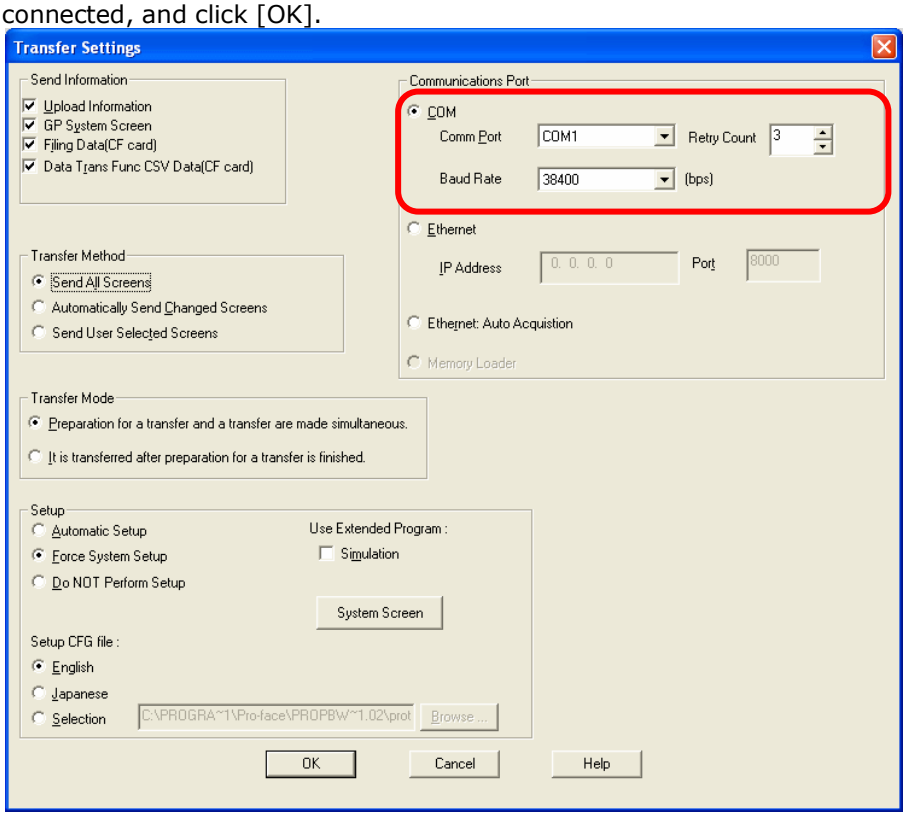


(2) Start up GP-PRO/PBIII for Windows and click the [Transfer] icon on the Project Manager (Specify a desired project file.)

(3) On the [Transfer] window, select the [Setup] menu and click [Transfer Settings…].

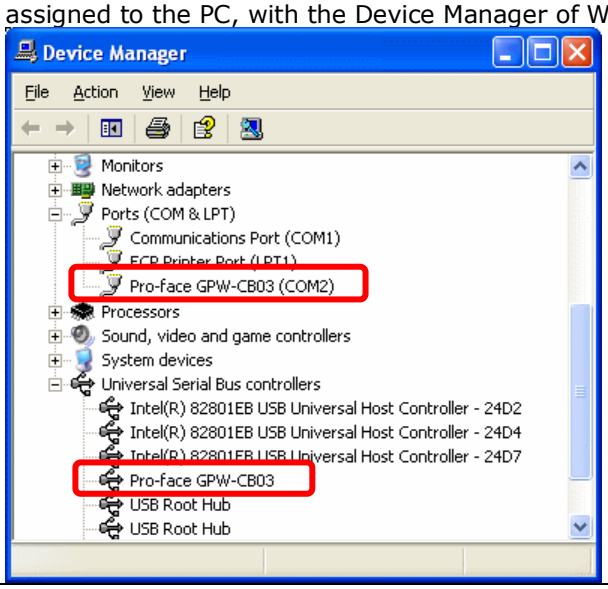


(4) In the Communication Port field, select [COM], specify the COM port to which the cable is connected, and click [OK].

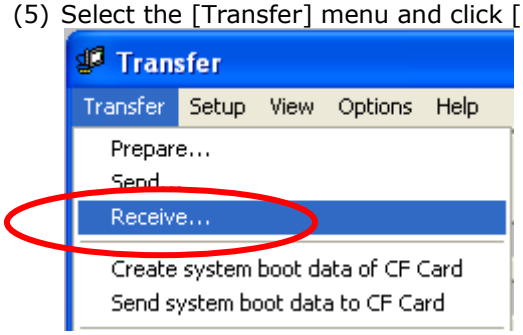


If you use a USB transfer cable (GPW-CB03)

You can check the COM port number for the USB transfer cable (GPW-CB03), which is assigned to the PC, with the Device Manager of Windows.



(5) Select the [Transfer] menu and click [Receive..].



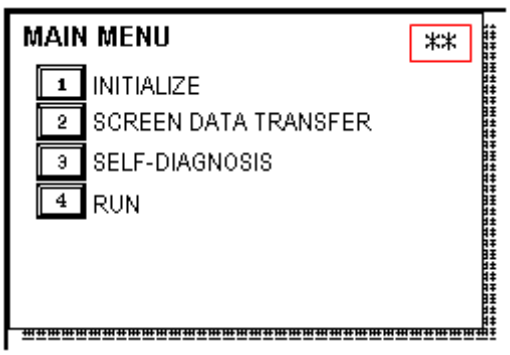
(6) Specify the location to save the received screen data at and the project file name and then save them.

In case there is no Upload Information

"Upload Information" is necessary to receive screen data from LT Type A. It needs to be included in screen data when transferring screen data to the display unit beforehand. The Upload Information is sent to the display unit by default, however, you may check off the box of Upload Information to prevent screen reception by a third party.

You can check in the following way if the Upload Information has been sent or not.

1. Enter into the offline mode on LT Type A.
2. If there are 2 asterisk (*) marks in the Main menu as shown below, the Upload Information has been sent.

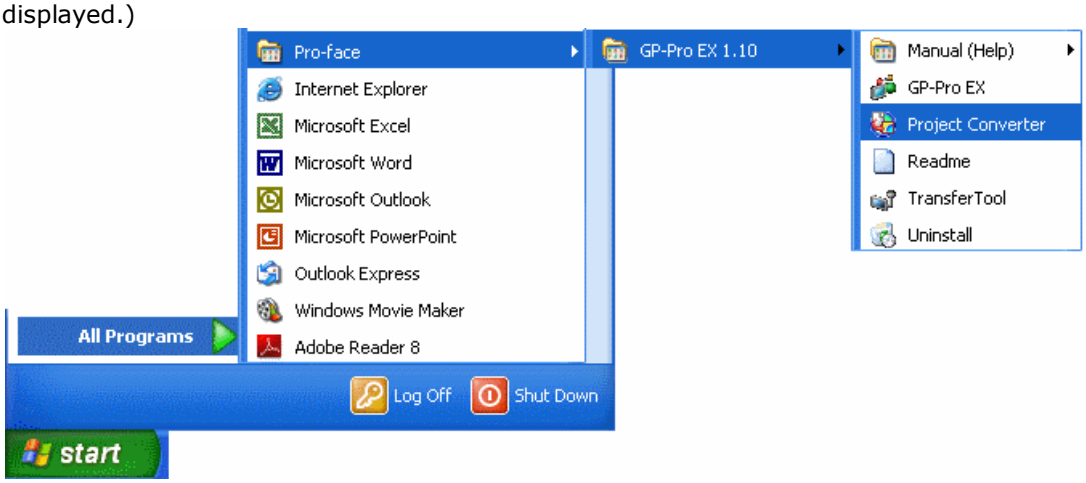


If not, there is no Upload Information sent. In this case, a message, which indicates there is no Upload Information," appears and you cannot receive the data.

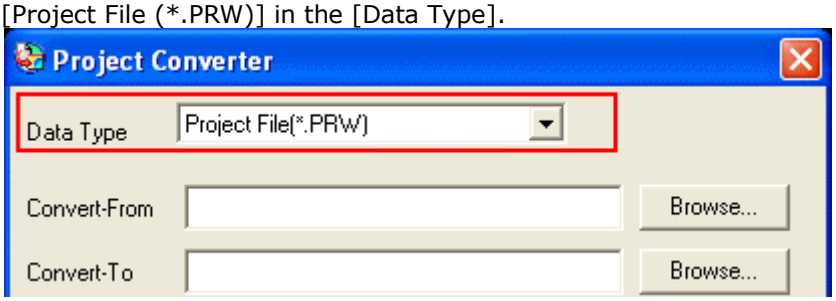
3.4 Convert screen data with the Project Converter

Convert the project file (*.prw) for LT Type A with the GP-Pro EX's Project Converter.

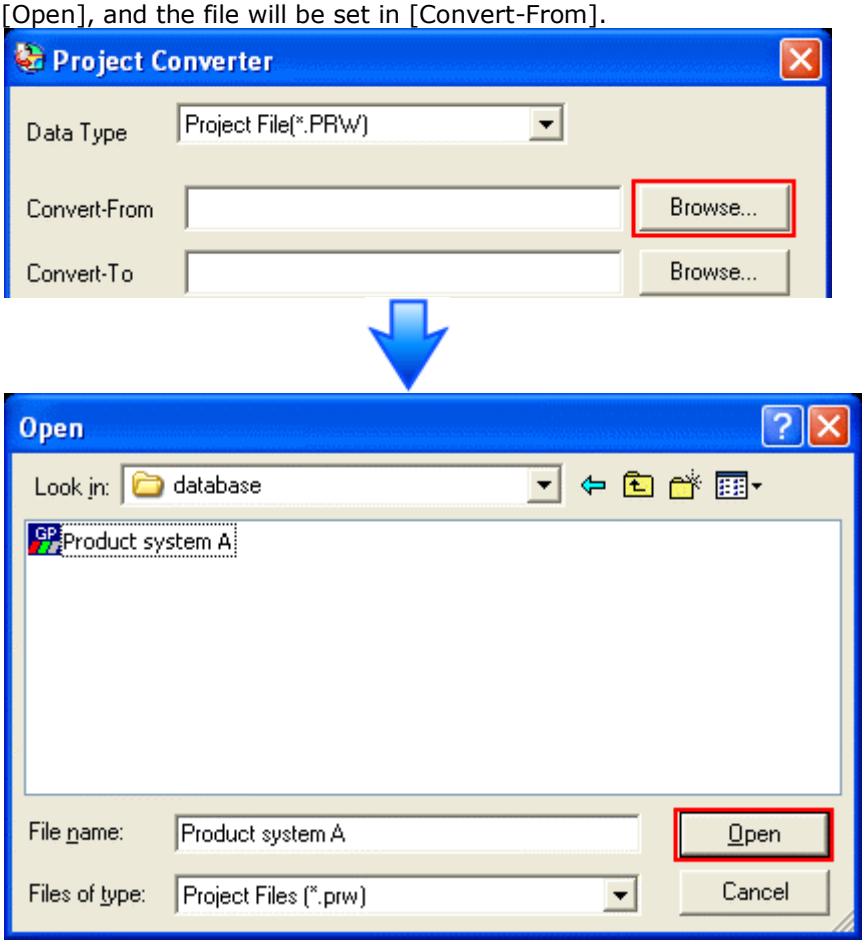
1. Click the [Start] button, select [All Programs] ([Programs]->[Pro-face]->[GP-Pro EX *.**]->[Project Converter]) (For this part, [*.**], the version of the software you use is displayed.)

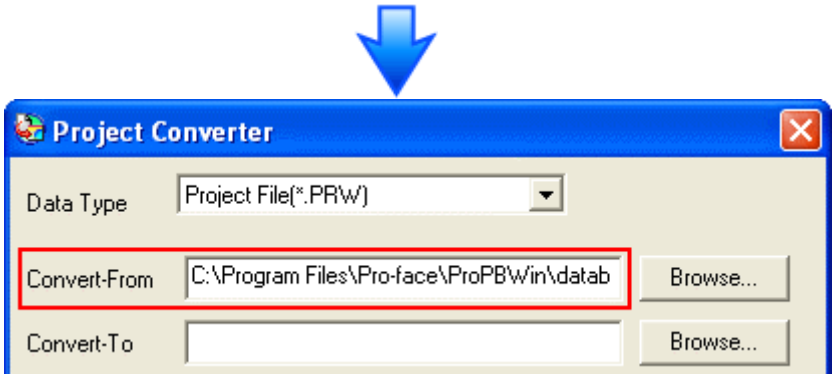


2. The Project Converter starts up and the [Project Converter] dialog box opens. Select [Project File (*.PRW)] in the [Data Type].

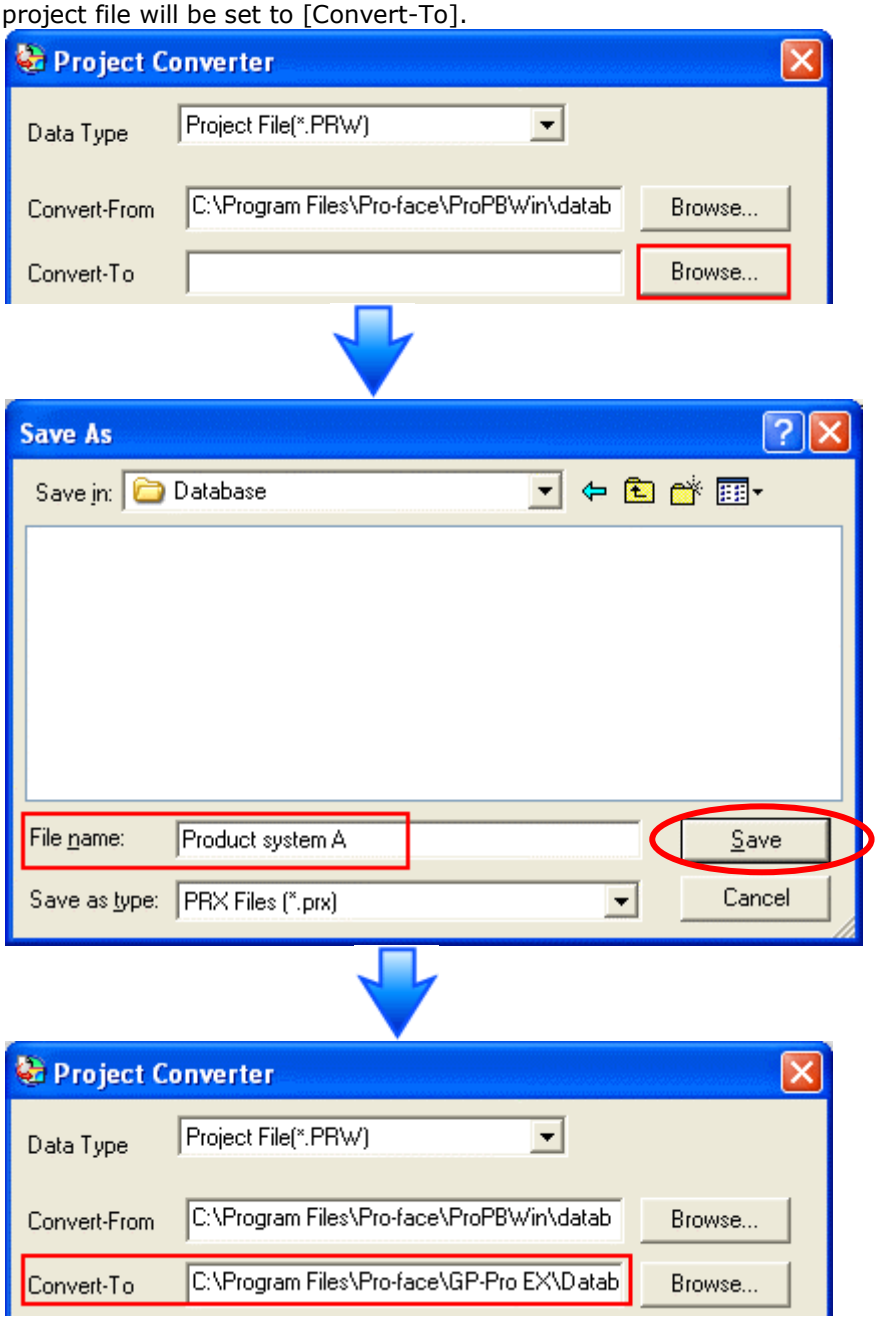


3. Click the [Browse…] button and select a project file (e.g.: "Project system A.prw"). Click [Open], and the file will be set in [Convert-From].



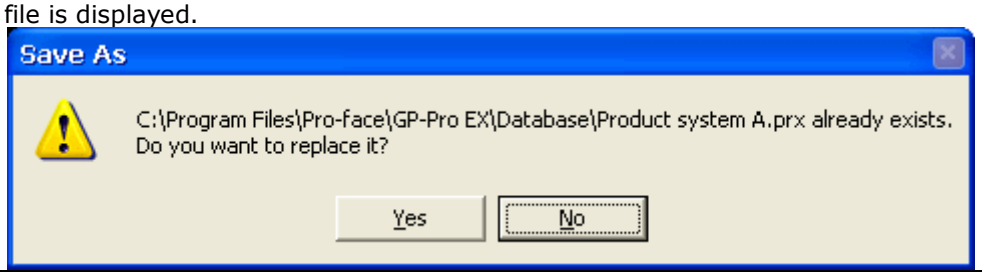

Project Converter
Data Type
Project File(*.PRW)
Convert-From
C:\Program Files\Pro-face\ProPBWin\datab
Browse...
Convert-To
Browse...

4. In [Convert-To], designate a GP-Pro EX's project file (*.prx). Click the [Browse...] button and enter a new [File Name] (e.g.: "Product system A.prx"). Click [Save], and a new project file will be set to [Convert-To].

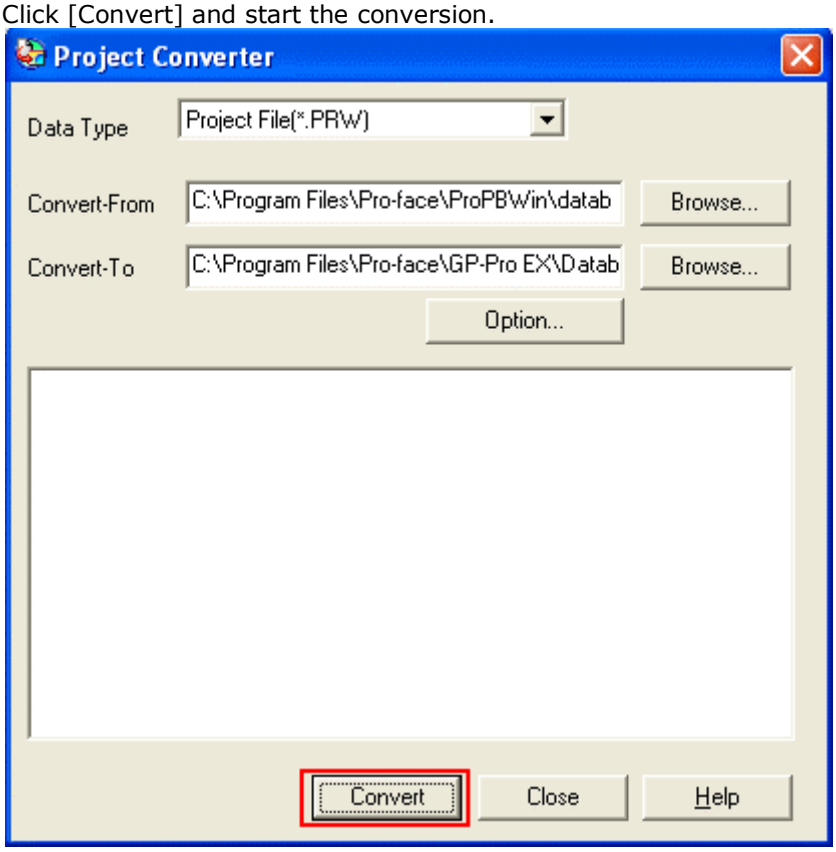


NOTE

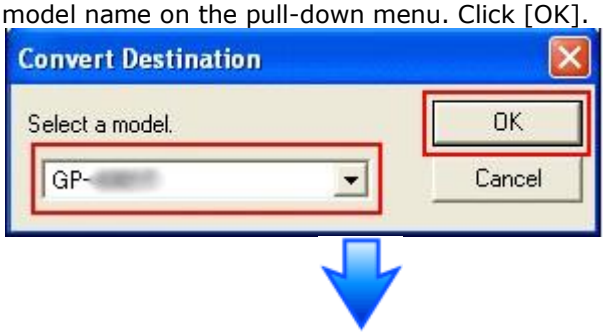
When a convert-to file exists, the window that confirms whether or not to overwrite the file is displayed.

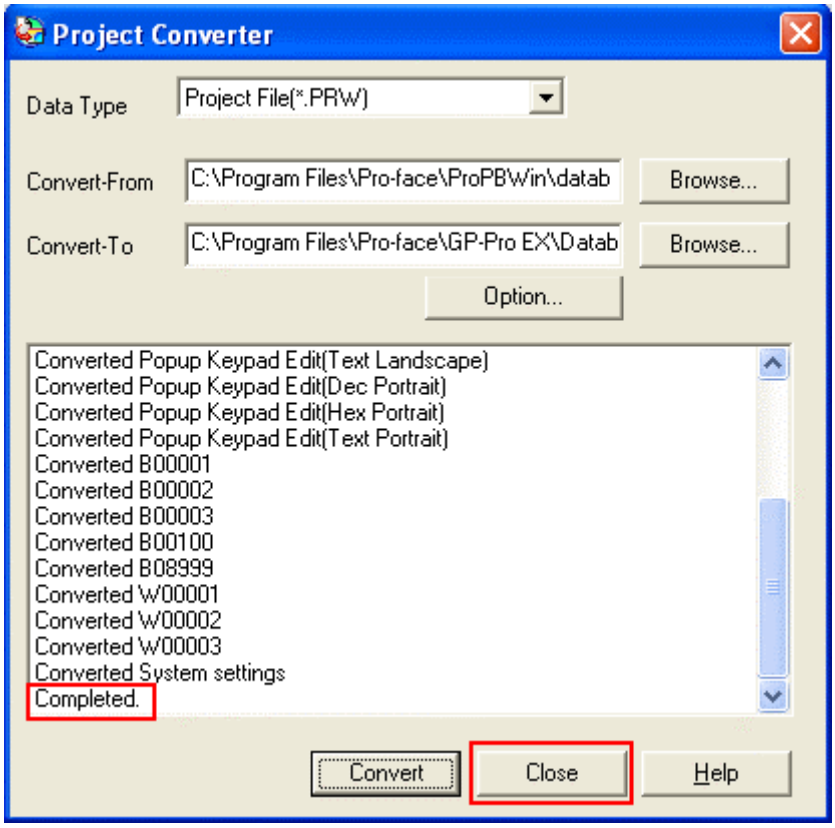


5. Click [Convert] and start the conversion.



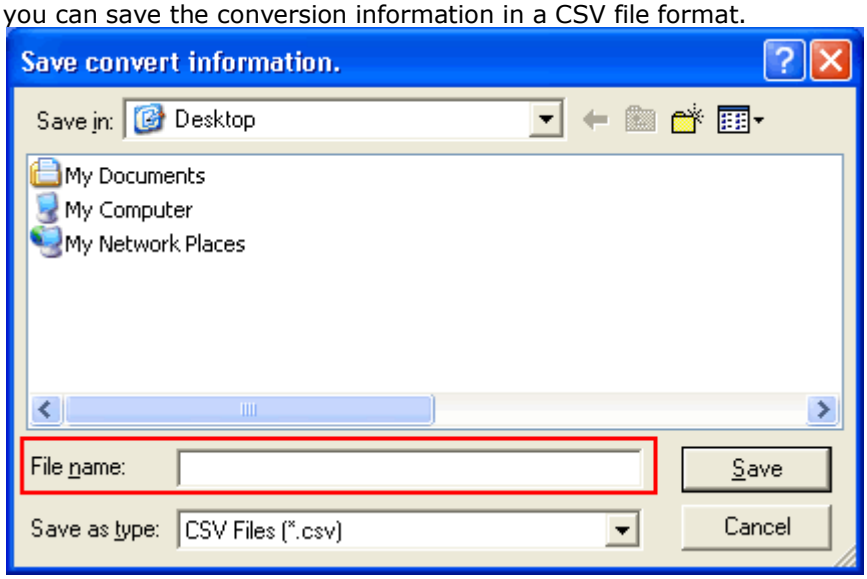
6. If you are asked about the [Convert-To] type as shown below, select the replacement model name on the pull-down menu. Click [OK].





If an error message is displayed during conversion,
If an error message is displayed during conversion, refer to [Project Converter Error Message] (http://www.pro-face.com/otasuke/qa/gp3000/replace/soft/conv/project_converter_error.html) on our Web site called [OtasukePro!] for the cause and the solution.

7. After conversion, the [Save convert information] dialog box appears. If you click [Save], you can save the conversion information in a CSV file format.



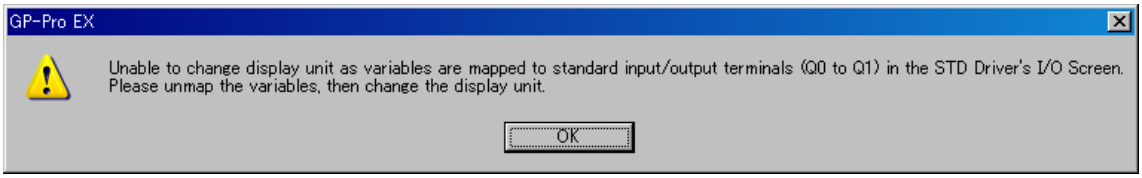
NOTE
Because the differences at the time of conversion from GP-Pro/PBIII for Windows are described in the saved file, the project file (*.prx) after conversion can be checked and modified according to the conversion information.

8. Click [Close] to close the [Project Converter] dialog box.
9. If you double click the project file (*.prx) after conversion, GP-Pro EX will start and the file will open.

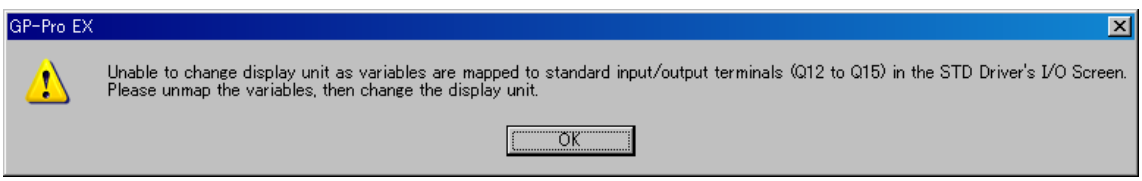
3.5 Transfer the project file to LT-4301TM

The converted project file is LT3000 series data.
Change the model to LT-4301TM (Modular Type DIO) on GP-ProEX.
Due to the difference of I/O points, the model may not be changed.
Be sure to reduce the I/O points in the I/O setting of LT3000 series before changing the model to LT-4301TM (Modular Type DIO), otherwise the following warning window will appear.

LT3000		LT-4301TM
Q0 to Q1	->	Q0 to Q1 cannot be used for standard output. Cancel the settings and then change the model. (Figure 3.5.1)
Q2 to Q11	->	Q2 to Q11 can be used.
Q12 to Q15	->	Q12 to Q15 don't exist in LT-4301TM. Cancel the settings and then change the model. (Figure 3.5.2)



[Figure 3.5.1]



[Figure 3.5.2]

3.6 Transfer the project file to LT-4301TM

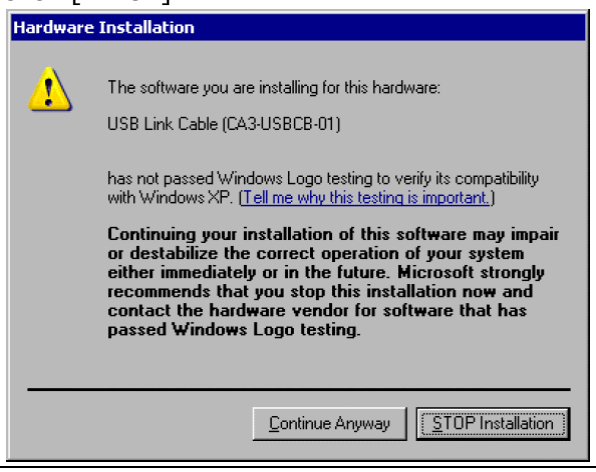
After conversion and model change, transfer the project file to LT-4301TM. You can transfer data to LT-4301TM via a USB transfer cable (model: ZC9USCBMB1), a USB storage unit, or Ethernet.

This section explains, as an example, how to transfer screen data with a USB transfer cable.

1. Connect your PC and LT4301TM with a USB transfer cable (model:ZC9USCBMB1). If the driver of the cable has not been installed on your PC yet, a dialog box will appear. Please follow the instructions.

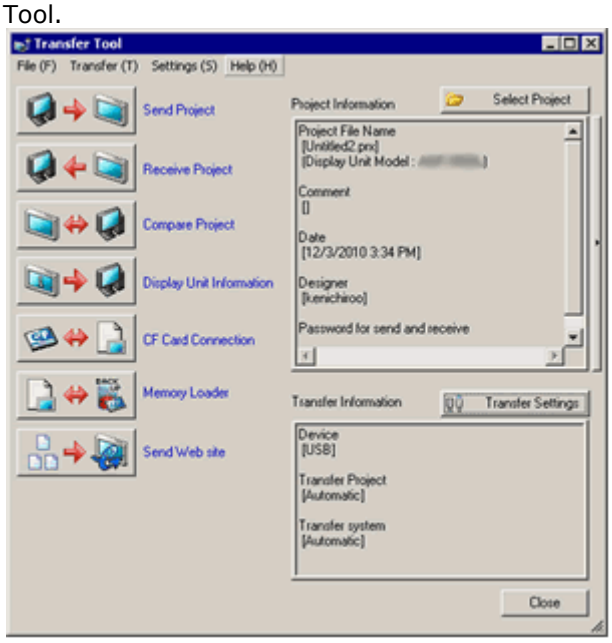
NOTE

The "Hardware Installation" dialog box as shown below may appear during installing the USB driver depending on a security level of Windows® XP. Click [Continue Anyway] to start installing the driver. When installation is completed, click [Finish].



2. Turn on the power of LT4X01TM series. The "Initial Start Mode" screen will appear on the display unit. After transferring a project file once, this screen will not appear again.

3. On the GP-Pro EX's State Toolbar, click the [Transfer Project] icon to open the Transfer Tool.

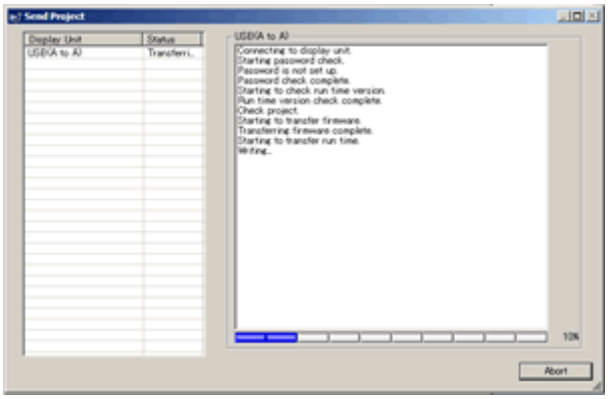


To transfer a different project file, click the [Select Project] button and select a project file.

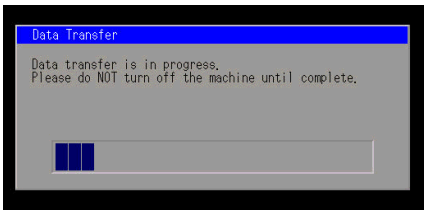
4. Make sure that the [unit] in the "Transfer Settings Information" is set to [USB]. If not, click the [Transfer Settings] button to open the "Transfer Setting" dialog box. Select [USB] in the Communication Port Settings field and click [OK].

5. Click [Send Project] to start transfer. When the following dialog box appears, click [Yes].This dialog box doesn't appear when the same project file is sent again.

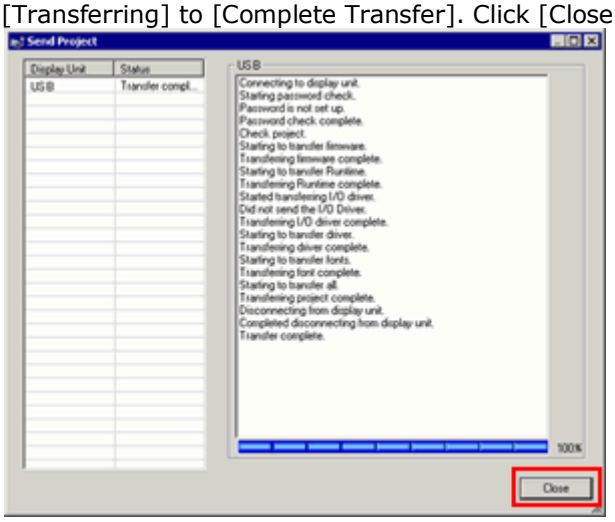
6. The following dialog box appears during transfer and you can check the communication status. (The display unit enters the Transferring mode and communication with the unit such as a PLC is terminated.)



Display Screen



7. When transfer is completed, the status displayed in the dialog box will change from [Transferring] to [Complete Transfer]. Click [Close] to close the dialog box.



The display unit will be reset and a screen of the transferred project file will be displayed.

8. Close the Transfer Tool.
9. Click the [X] mark on top right of the screen or [Project]->[Exit] to close GP-Pro EX.

3.7 Differences of software

3.7.1 Differences after conversion

Check the differences of screen data after conversion from GP-PRO/PBIII to GP-Pro EX. For the details of each item, refer to our website.

http://www.proface.co.jp/otasuke/circle/conv_3000/soft.htm

Differences of software

Differences of screen data

1	Touch Panel Type
2	Compatibility of Bit Switch
3	Compatibility of Alarm
4	Compatibility of Trend Graph
5	Compatibility of K Tag (Input Order)
6	Compatibility of K Tag (Difference of Writing)
7	Compatibility of K Tag (Indirect Setting)
8	Compatibility of N Tag
9	Precautions for using the switch for [History Data Display] of Trend Graph on the window
10	About window display on a momentary switch during momentary operation
11	About the performance when a display area of the system window is overlapping
12	Change of Tag Process
13	About the display when a fixed Draw is placed on a Part
14	Compatibility of Text
15	Compatibility of Fill
16	Compatibility of CF Card Data
17	Precautions for conversion when filing data is saved in a CF card
18	Precautions for setting "Color Settings" to [256 Colors without blinking]
19	Precautions for loading a part with "L Tag (Library Display)"
20	Compatibility of MRK files and CPW files
21	Compatibility of V Tag/v tag and Video Screen
22	Compatibility of Extended SIO Script
23	Compatibility of Sound Data
24	Compatibility of unit Monitor
25	Compatibility of Ladder Monitor
26	Compatibility of J Tag and R Tag
27	Converting Screen Data of DOS
28	Compatibility of Standard Font
29	D Script starts right after screen change or power on.(Compatibility of D Script Trigger Condition)
30	The position shifts when loading a window screen (Compatibility of U Tag)
31	Precautions for using Screen Level Change
32	Compatibility of Symbol
33	Compatibility of H Tag

Logic Program Differences

1	Restriction Comparison	
	1-1	Comparison of Performance Specifications
2	Differences of Settings	
	2-1	Differences of Constant Scan Setting
	2-2	Controller Auto Start Setting
	2-3	Order of storing character string data
	2-4	Types of symbol variables to be used in a command
3	Setting Changes	
	3-1	Ladder Monitor Screen
	3-2	Conversion when a logic program error occurs
	3-3	Converting a logic file (*.WLL)
	3-4	DIO Drivers
	3-5	Differences for Bit Set of integer variables
	3-6	Setting an initial value of a variable
	3-7	Conversion of variables to be undefined addresses
	3-8	Restriction of array elements
	3-9	Uniwire Driver
	3-10	Assigning array variables via Configure I/O
	3-11	No drivers assigned
	3-12	The system variable '#Screen' for switching screens
	3-13	For Integer Array, when accessing a bit
	3-14	Differences of LS variables
4	Variable/Instruction Conversion	
	4-1	Differences of Fix Variable Mode
	4-2	Differences of LS variables
	4-3	Temporary variables
	4-4	Control block variables of the PID instruction
	4-5	Differences of system variables
	4-6	Instruction Conversion
	4-7	If the second operand of the PID instruction is an integer constant,
	4-8	Values of variables ‘LS’ and ‘LSS’
5	Comment/Label Conversion	
	5-1	Program Comment
	5-2	The number of characters in a rung comment Rung comments including [START], [END], [SUBSTART**] or [SUBEND**] Capacity of a rung comment
	5-3	The number of characters in a variable comment Capacity of a variable comment Comments of reference variables
	5-4	User Label
	5-5	Subroutine
	5-6	Converting the project including comments entered on the OS in another language.