



TPC1

User's Manual



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1. Introduction

The **TPC1** is an advanced handheld HMI terminal, which integrates color touchscreen display, powerful multi-axis motion controller, high-speed communication interface and operator safety devices into one compact and convenient unit.

The **TPC1** utilizes proven 32-bit RISC CPU equipped with specific motion control firmware to control, with unparalleled simplicity and precision, motion systems comprised of any combination of servo and step motors from 1 to 16 axis and 512 DI/DO. Furnished with **Fics-III** Basic-like language, **Fics-IV** natural language or Ladder Motion language, the **TPC1** uses the very powerful nature of these programming languages to enhance versatility and flexibility of motion control systems. The **TPC1** employs **WinPANEL**, window-based graphic development software, to create functional, multi-language interfaces, which enable the operator to directly control automation systems using a color touchscreen.

2. Features

All digital design using ASIC and SMT technology.
5.7 inches, 320 x 240 pixels, 64 colors touchscreen, backlit display.
Emergency Stop switch.
3-position safety switch (OFF-ON-OFF) required by US Robotic Safety Standard.
12 mechanical keys and 6 LEDs.
Audible signaling device (buzzer).
Choice of programming languages: <ul style="list-style-type: none">- <i>Fics-III</i> Basic-like language- <i>Fics-IV</i> Natural language- Ladder Motion
Multi-function motion controller: <ul style="list-style-type: none">- multi-tasking- multi-axis linear and circular interpolation- multiple velocity profiles- ± 1 pulse high precision Point-to-Point control- matrix and pallet functions
High-speed serial communication links: <ul style="list-style-type: none">- RS485 at 625 Kbps- RS422 at 2.5 Mbps
External Inputs / Outputs: <ul style="list-style-type: none">- Expandable to 512 DI/DO opto-isolated or relay type
Supply power requirements: 1.3A @ 24VDC +/-5%

3. Specifications

3-1. Power Supply and Environment

Item		Specifications
Power Supply	Voltage	DC +24V +/- 5%
	Current	1.3A
	Memory Backup	Approx. 3 years (25 Deg.C)
Environment	Working Temperature	0--40 Deg.C
	Humidity	25%-85% RH
	Storage Temperature	-10 – 60 Deg.C

3-2. LCD and Controller

Item		Specifications
Display	LCD Type	STN Color
	Size	5.7 inch
	Pixel	380 x 240
	Colors	64
	Screen No.	500 Screens (Max)
	Backlit	CFL
CPU	32 Bit RISC	SH-1 (CBIC)
Memory	Flash-1	16M bit
	Flash-2	8M bit
	SRAM	1M bit
	DPRAM	256 Bytes
Touch Panel		Analog Resistor Film

3-3. Motion Controller

Item		Specifications
Motion Control	No. of Axis	16 or 8
	Programming Language	<i>Fics-III, Fics-IV</i> or Ladder Motion
	Programming Capability	Max 3000 Steps (<i>Fics-III, IV</i>), Multi-tasking
CPU	32 Bit RISC	SH-4 160MHz
Memory	Flash	16M Bit
	SRAM	4M Bit (Battery Backup)
	SDRAM	128M Bit
Interfaces	Drive I/F	RS485 (625kbps), RS422 (2.5Mbps)
	I/O	RS422 (1.25Mbps)
	No. of I/Os	256DI & 256DO (Max)
Communication Protocol		Dynax, proprietary

3-4. Keys and Switches

Item	Specifications
Emergency Stop Switch	Mushroom style head, locking mechanism, up to 3 N.C. contacts.
3-Position “Deadman” Switch (optional)	3-position switch (OFF-ON-OFF) with 2 dry contacts.
Function Keys	F1-F6 used for system setting in <i>Fics-III/IV</i> . Programmable in Ladder Motion.
SHIFT Key	Extends the range of function keys.
Other Keys	START, STOP, ORG, CLR used as program start/stop, homing, and error reset in <i>Fics-III/IV</i> . Programmable in Ladder Motion.

3-5. Connector Definition:

3-5-1 RS232C Port (DSUB9 Male Connector)

The RS232C port is located behind a movable, protective cover at the bottom of the terminal. This port is used for connection to the PC to download or upload screen graphics created with WinPANEL software; and to download or upload *Fics-III/IV* application programs created with WinFics software.

Pin No.	Signal Name	IN/OUT	Pin No.	Signal Name	IN/OUT
1			2	RXD	IN
3	TXD	OUT	4		
5	GND	-	6		
7	RTS	OUT	8	CTS	IN
9	+5V	OUT			

3-5-2 Primary Connection:

There are three connectivity options for TPC1 terminal:

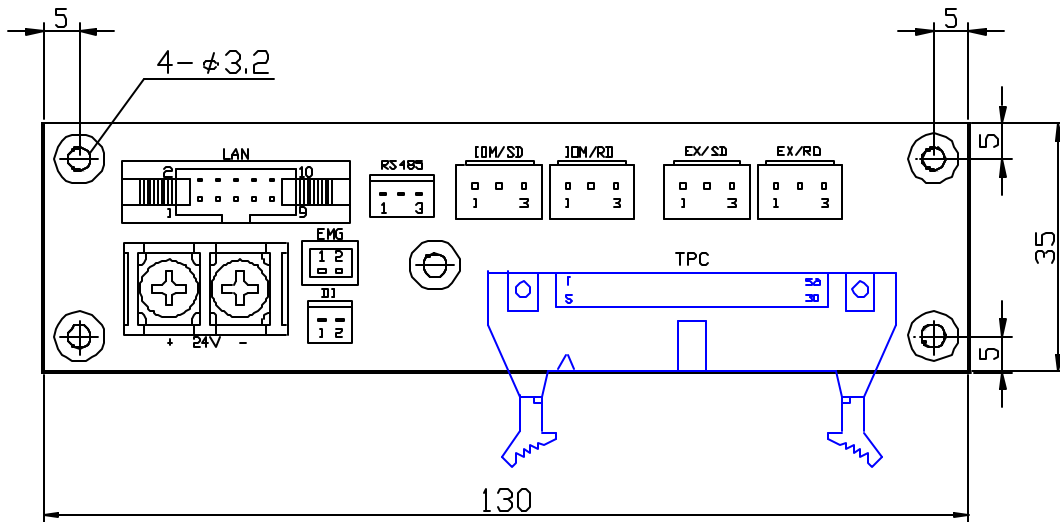
TPC1 Type	Connectivity Option
TPC1/D	2 meter long cable terminated with a DSUB 25Pin (Female) connector.
TPC1/H	2 meter long cable terminated with a circuit board with multiple discrete connectors.
TPC1/S	Circuit board with multiple discrete connectors mounted on the back of the TPC1 case.

TPC1/D Option (Cable with DSUB25 Female Connector):

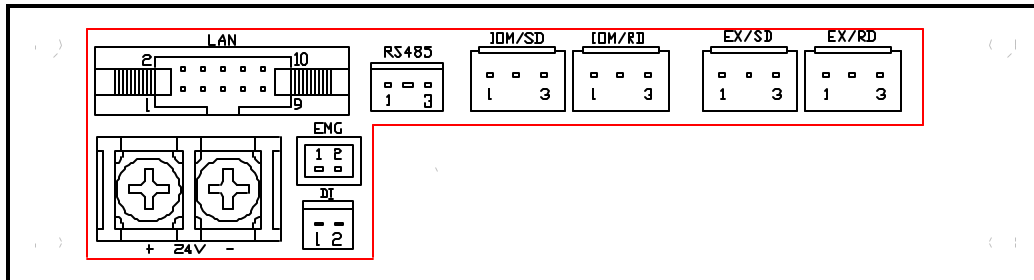
Pin	Signal Name	I/O	Usage	Pin	Signal Name	I/O	Usage
1	422GND	-	IO-Ring(IOM)	14	SD-	OUT	IO-Ring(IOM)
2	SD1+	OUT	IO-Ring(IOM)	15	RD-	IN	IO-Ring(IOM)
3	RD1+	IN	IO-Ring(IOM)	16	422GND	-	SRing-LAN
4	SD2+	OUT	SRing-LAN	17	SD2-	OUT	SRing-LAN
5	RD2+	IN	SRing-LAN	18	RD2-	IN	SRing-LAN
6	485+	IN/OUT	RS485	19	NC	-	
7	485-	IN/OUT	RS485	20	DI1	IN	Digital Input
8	485GND	-	RS485	21	+24V	IN	Power Supply
9	NC	-		22	24GND	-	Power Supply
10	NC	-		23	NC	-	-
11	NC	-		24	EMG	OUT	E-Stop
12	NC	-		25	EMG COM	-	E-Stop
13	NC	-					

TPC1/H Option (Cable with Circuit Board):

Dimensions are in “mm”



TPC1/S Option (Circuit Board mounted on the back of the case):



Connectors and pins definition for TPC1/H and TPC1/S options are listed below:

Power Supply Terminal Block (24V)

Pin No.	Signal Name	IN/OUT
1	+24V	IN
2	24GND	-

LAN (RS422)

for Communicating with PC for uploading/download screen graphics and Fics programs

Pin No.	Signal Name	IN/OUT	Pin No.	Signal Name	IN/OUT
1	SD+	OUT	2	SD-	OUT
3	422GND	-	4	NC	-
5	RD+	IN	6	RD-	IN
7	422GND	-	8	NC	-
9	NC	-	10	NC	-

RS485

for communicating with Atom-SRA/Atom-SLA servo drives

Pin No.	Signal Name	IN/OUT
1	RS485+	IN/OUT
2	RS485-	IN/OUT
3	485GND	-

IOM/SD

for interfacing with I/O modules

Pin No.	Signal Name	IN/OUT
1	SD+	OUT
2	SD-	OUT
3	422GND	-

IOM/RD

for interfacing with I/O modules

Pin No.	Signal Name	IN/OUT
1	RD+	IN
2	RD-	IN
3	422GND	-

EX/SD (optional)

extended I/O interface with I/O modules

Pin No.	Signal Name	IN/OUT
1	SD+	OUT
2	SD-	OUT
3	422GND	-

EX/RD(optional)

extended I/O interface with I/O modules

Pin No.	Signal Name	IN/OUT
1	RD+	IN
2	RD-	IN
3	422GND	-

EMG

Emergency stop dry contact output

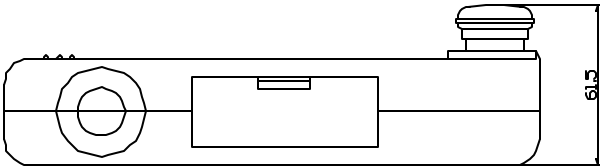
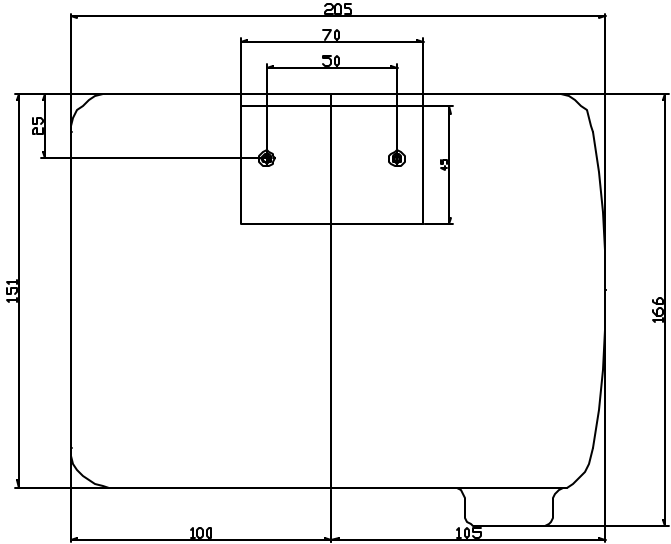
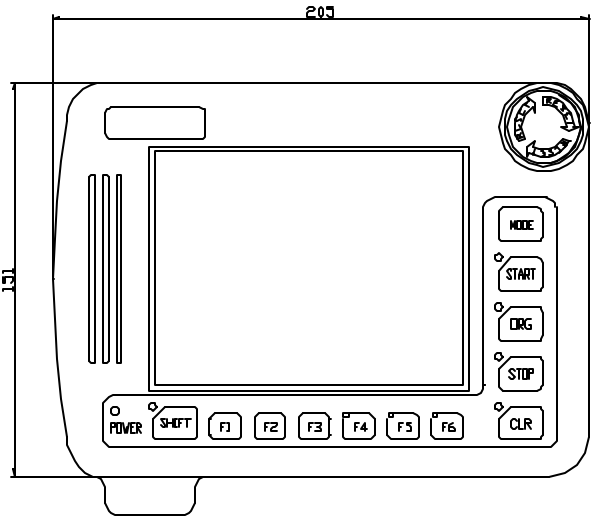
Pin No.	Signal Name	IN/OUT
1	EMG	OUT
2	EMG COM	-

DI

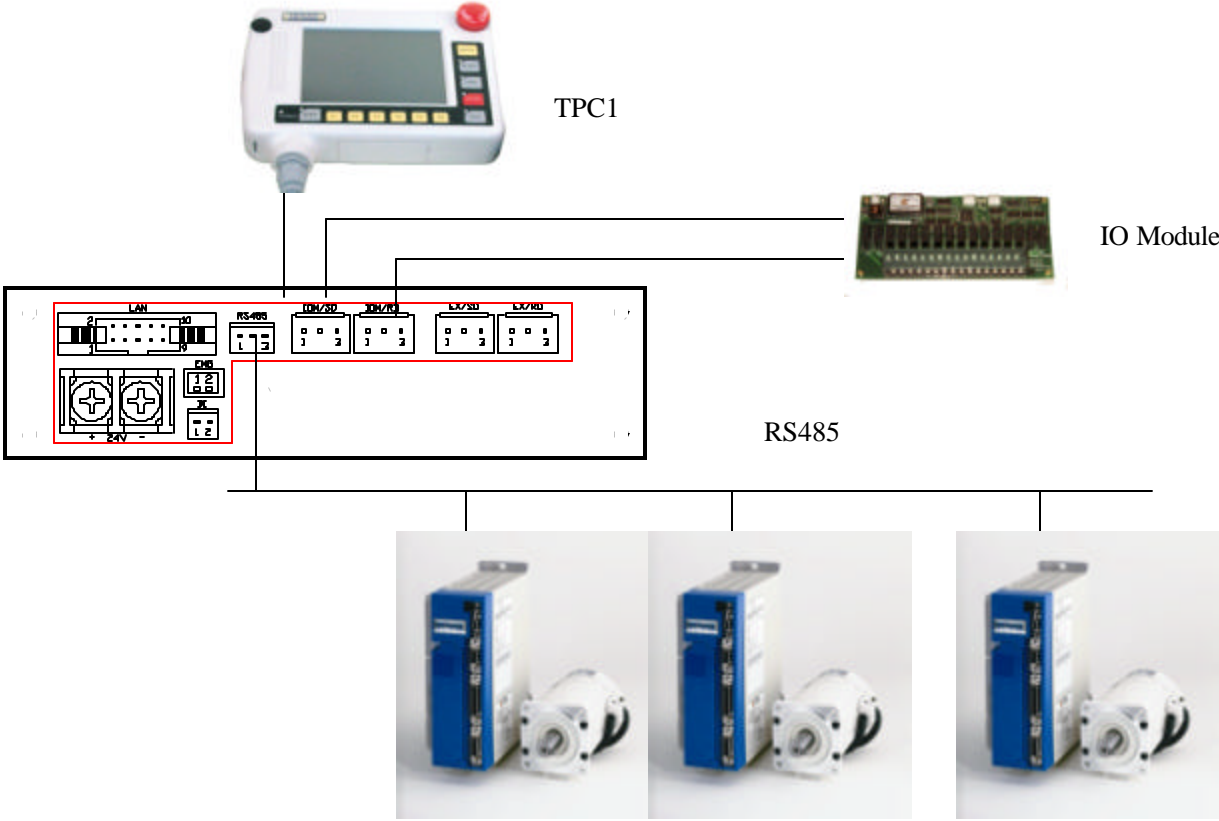
Digital input to TPC1

Pin No.	Signal Name	IN/OUT
1	DI	IN
2	COM	-

4. TPC1 Case Dimensions: (mm)



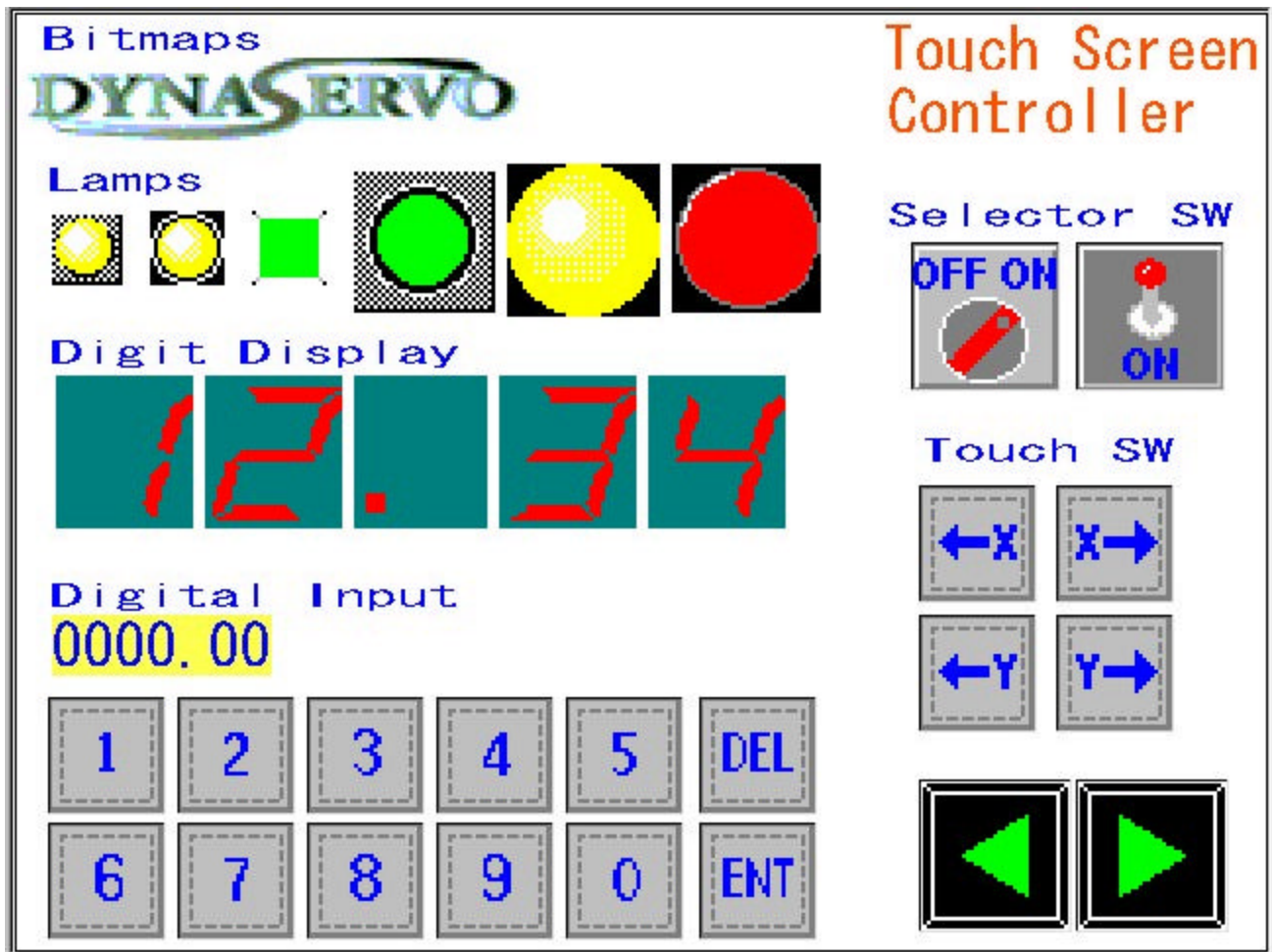
5. Typical System Configuration



Servo Drives (up to 16 axes)

6. Example of the TPC1 Screen

(created with WinPANEL software)



The above screen highlights interactive functionality of the TPC1. The screen can display:

- indicating lights
- touch switches
- selector switches
- digital displays
- alphanumeric characters
- multi-language text
- bitmaps
- special graphics

7. Touch Panel Settings

TPC1 enables user to calibrate touch panel offset, set buzzer properties and LCD contrast by pressing simultaneously <SHIFT>, <CLR> and <MODE> keys on TPC1.

```
== TPC1 Ver.1.20 ==
<F1> Touch Panel Adjust
<F2> Setup
<F3> Save
<F4> Font

<CLR> QUIT
```

F1: Calibrate offset of the touch panel
F2: Set buzzer and LCD contrast
F3: Save changes made
F4: Change fonts

CLR:Exit setting mode

```
== Touch Panel Adjust ==

Press Upper Left Corner

<F1:NEXT><CLR:QUIT>
```

Calibrate touch panel offset

A quarter circle will be displayed on the upper left corner.

```
== Touch Panel Adjust ==

Press Lower Right Corner

<F1:TEST><F2:PREV><CLR:QUIT>
```

Calibrate touch panel offset

A quarter circle will be displayed on the bottom right corner.

```
== Touch Panel Adjust ==

Press Touch Panel


<F1:END><F2:PREV><CLR:QUIT>
```

Confirm calibration result of touch panel offset.

Grid pattern will be displayed on screen. A cross symbol will be displayed at the location where touch panel is pressed. If OK, press <F1>. If NO, press <F2> to repeat calibration.

```

== Setup ==

<F1> Key  ON/OFF
<F2> Buzzer PANEL/ON/OFF
<F3> Backlight ON/60 min/10min
          75
0 
<F4:->          <F5:+>

          <CLR:END>

```

<F1>: Set Key as “ON” or “OFF”. If it is ON, a short sound is heard when any key or touch switch is pressed.
 <F2>: Set buzzer as “PANEL”, “ON”, or “OFF”
 <F3>: Set screen saver. If set as “ON”, screen is displayed all the time. If set as “60min” or “10min”, screen will be turned OFF (black) after 60 minutes or 10 minutes from the last touch. Press <CLR> key to turn screen ON again.
 <F4>, <F5>: Change LCD contrast

Default settings are shown in bold face.

Press CLR key to finish.

```

== Font ==

<F1> 8*8 Font
<F2> 8*16 Font
<F3> 16*16 Font
<F4> 8*8
<F5> 8*16
<F6> 16*16

<CLR> MENU

```

Set font size for the fonts to be displayed on TPC1 screen in default condition.

Press <CLR> to go to the setup main menu.

```

== Parameter Save ==

<F1: SAVE> <CLR: QUIT>

```

Save changes by pressing <F1>.

8. Accessories

Holding Strap

Protective Rubber Boot

9. Custom Features

To inquire about custom design features available for TPC1, please contact Dynaservo Inc.