

Example of Servo A5N Installation

April 1st, 2022

Panasonic Industry Co., Ltd.

This product is for industrial equipment.
Don't use this product at general household.

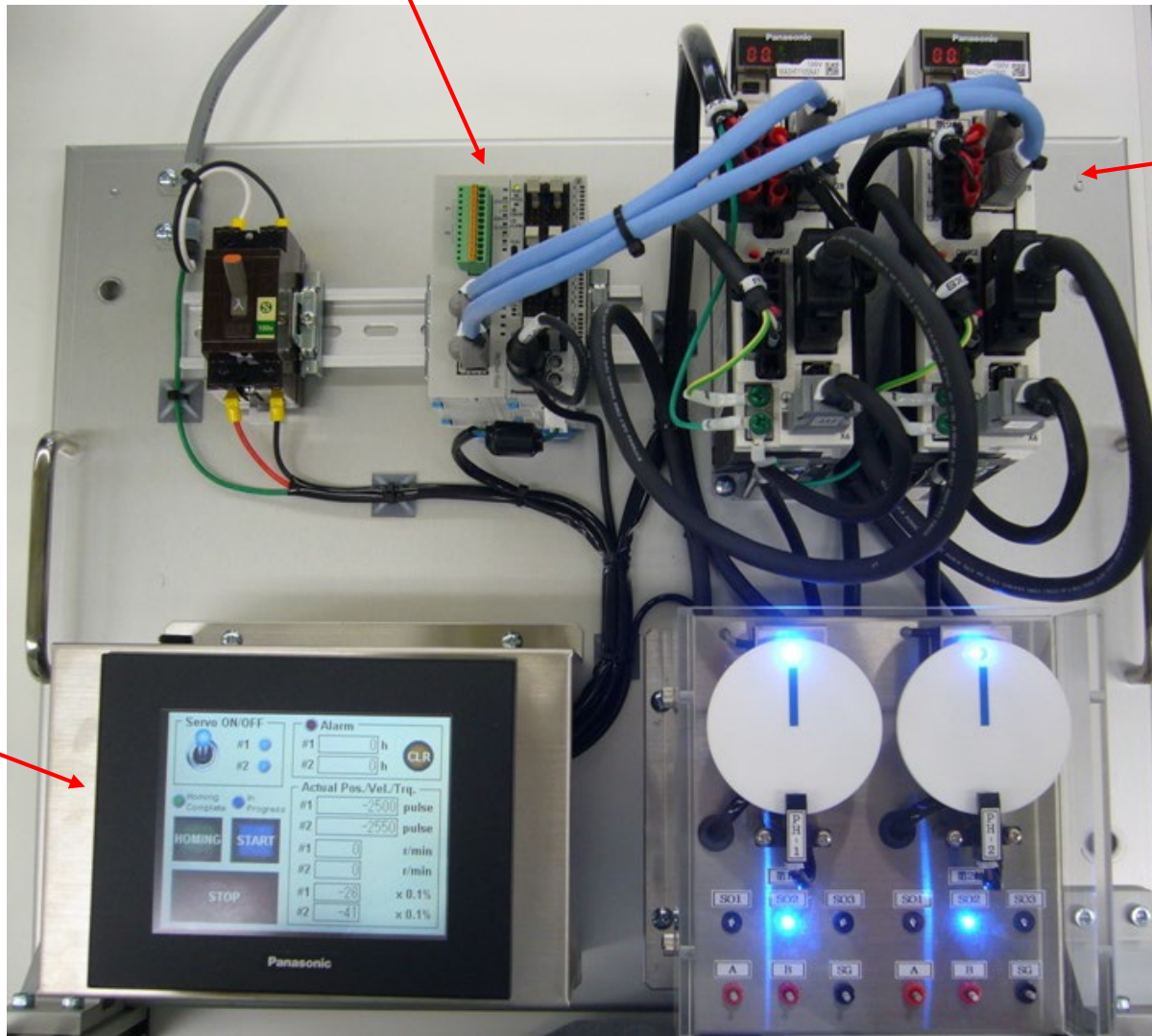
System Overview

Example System

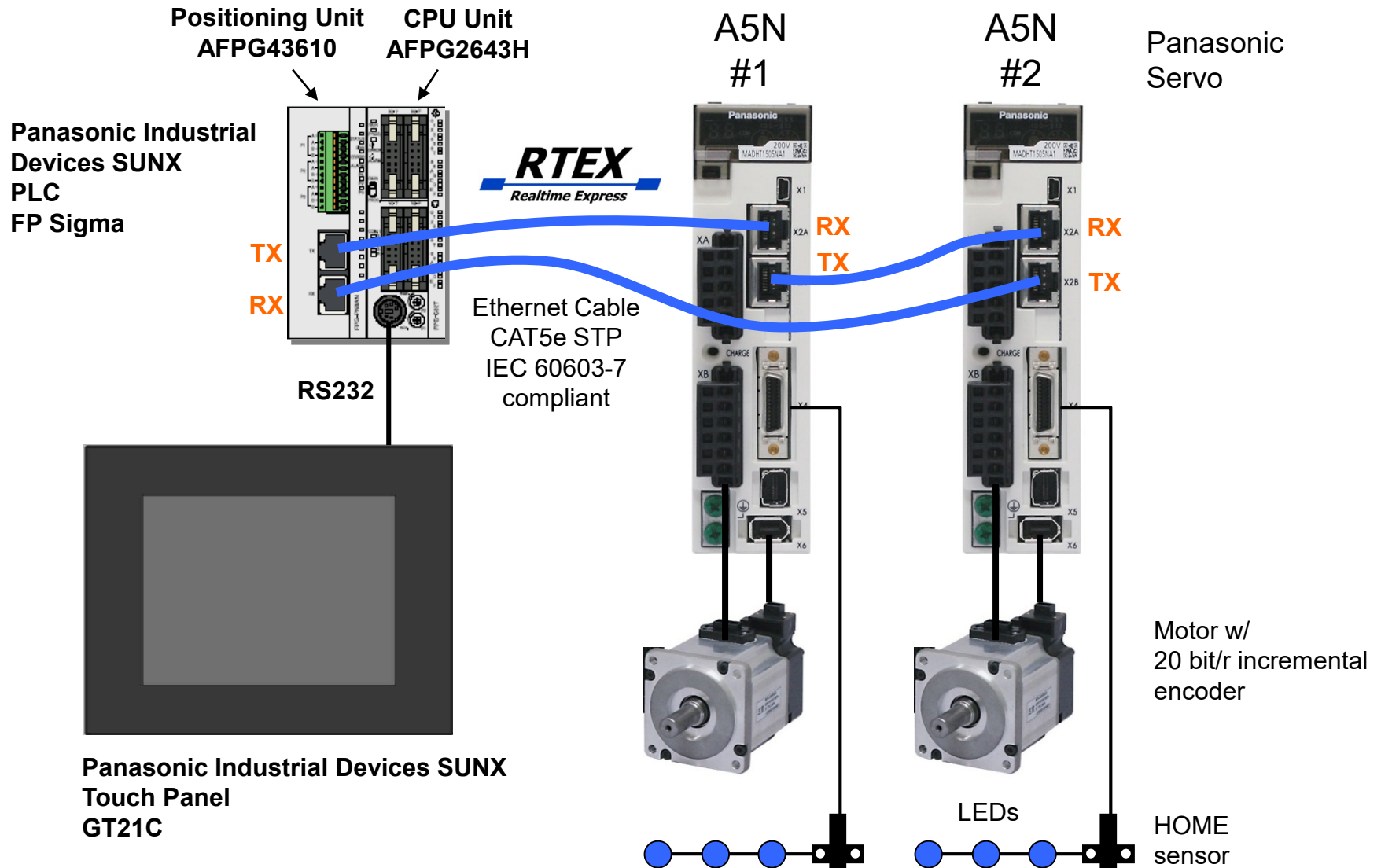
PLC

Servo
A5N
2-axis

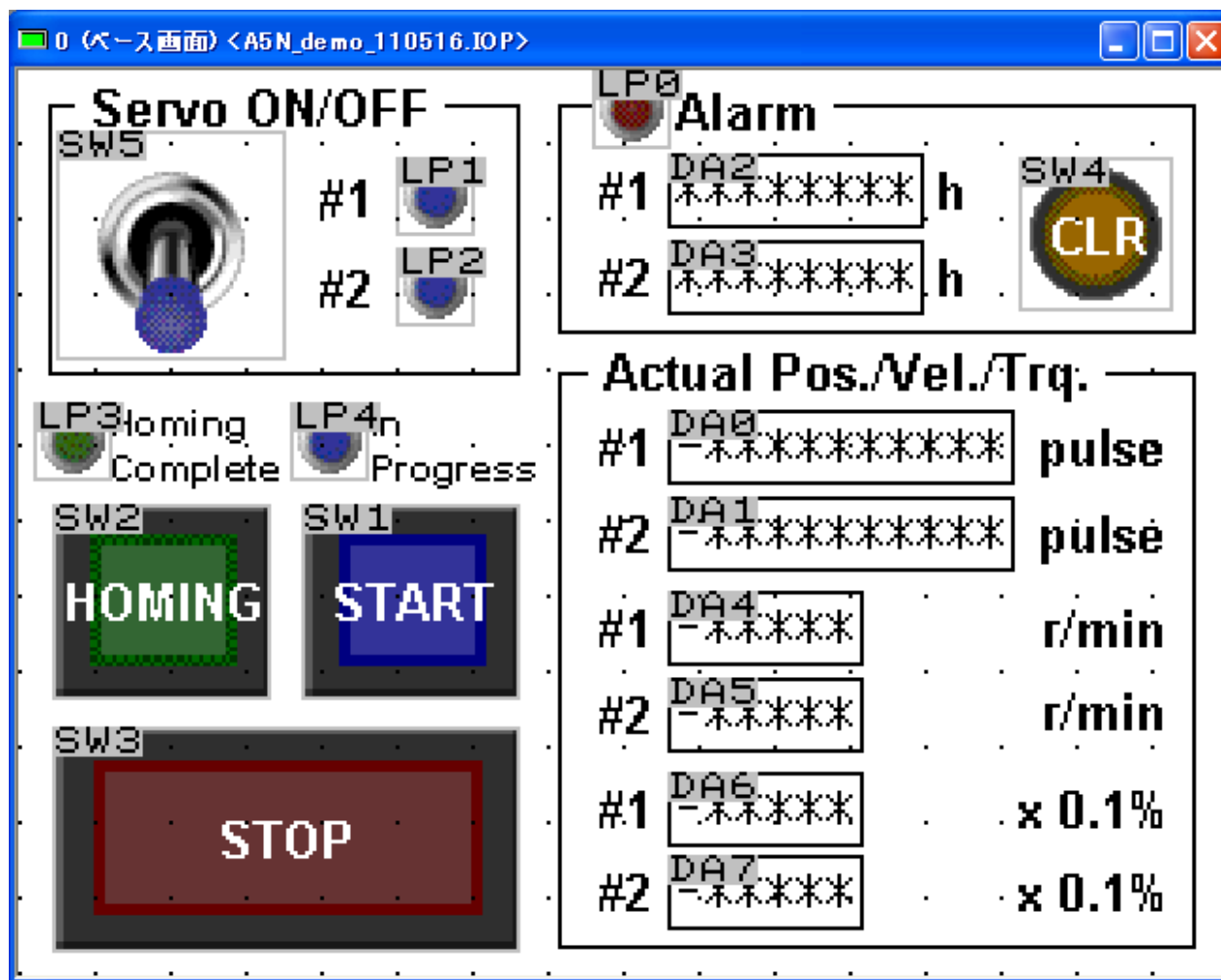
Touch Panel



System Structure



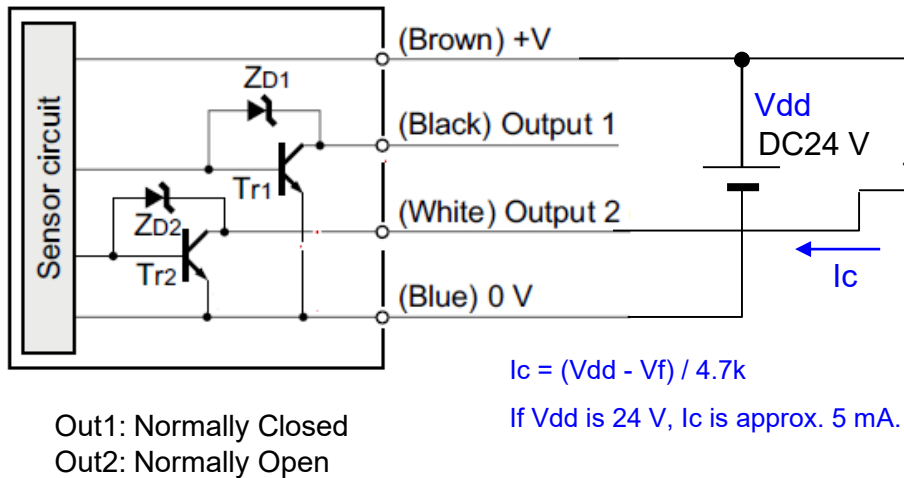
HMI on Touch Panel



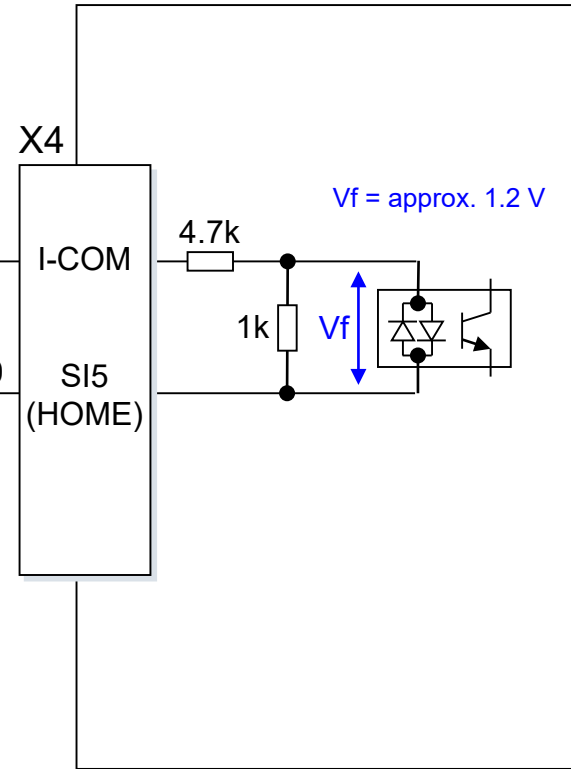
Wiring

HOME Sensor Wiring

Panasonic Industrial Devices SUNX
Photo-sensor
PM-T64
(NPN transistor output)

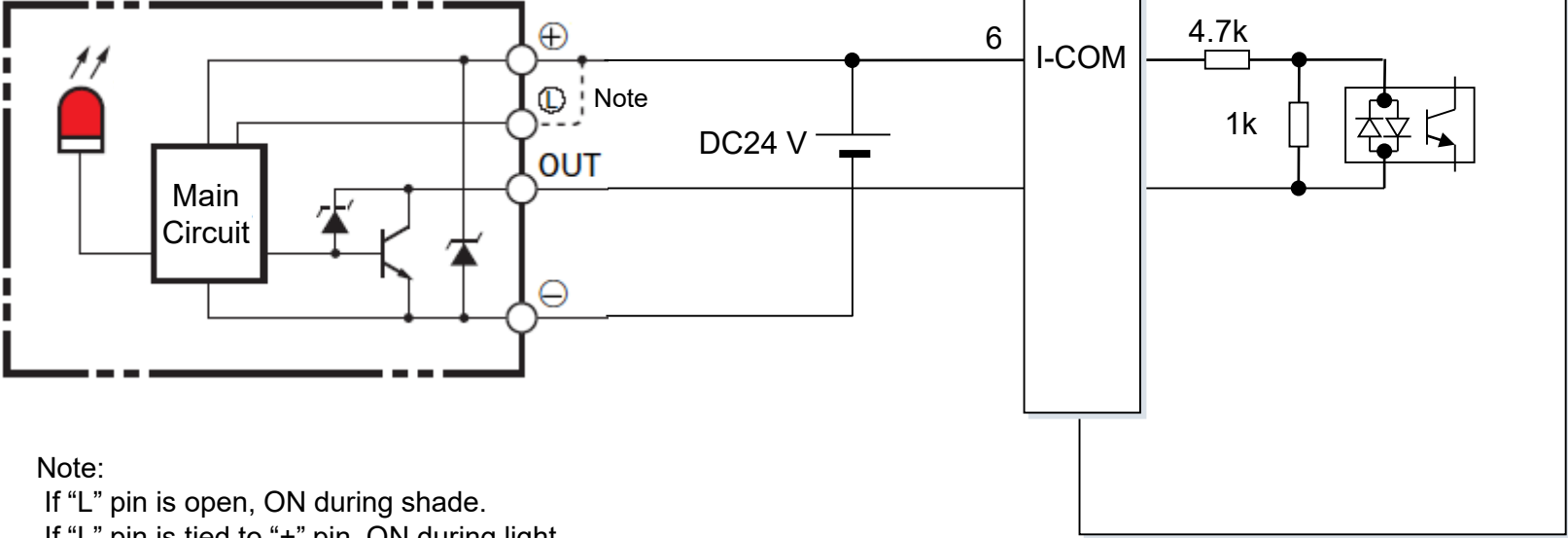


Servo Drive A5N



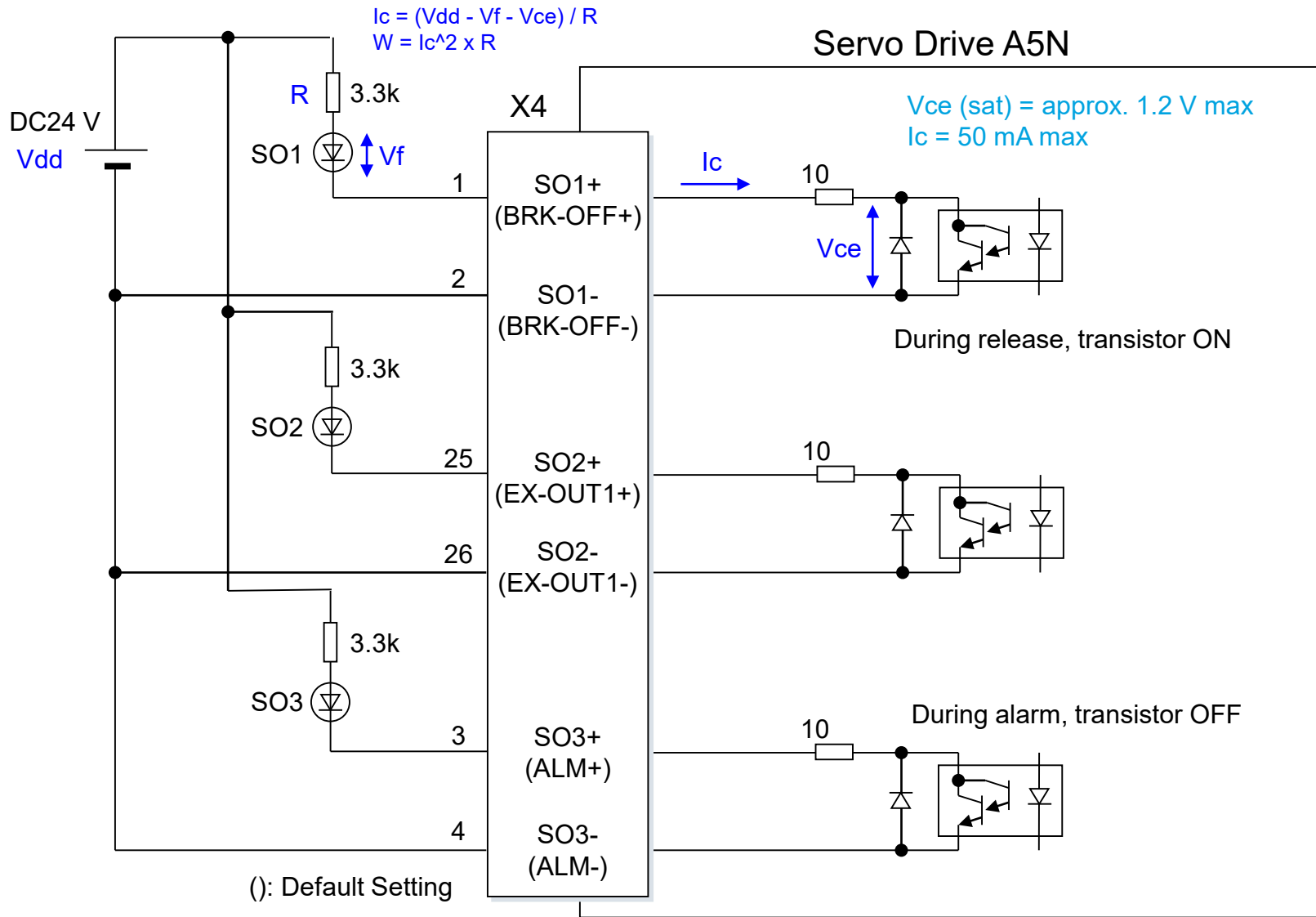
Another Sensor Case

OMRON
Photo-Sensor
EE-SX672A
(NPN transistor output)



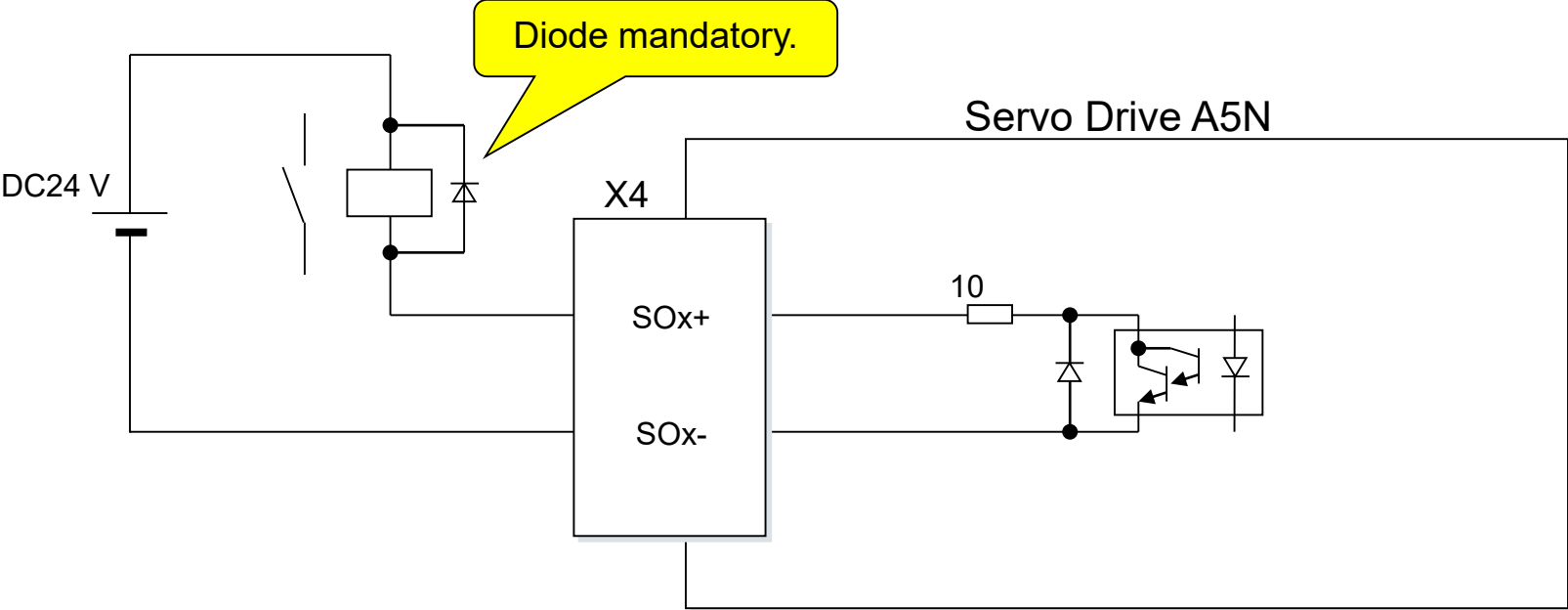
Note:
If "L" pin is open, ON during shade.
If "L" pin is tied to "+" pin, ON during light.

LEDs Wiring



Note: For the wattage of R, sufficient margin is required.

Relay Wiring Case



Counter-measures for Noise

Reducing PWM Noise Radiated from Drive

Install a ferrite core on motor cable.

Ferrite Core: ZCAT3035-1330 by TDK
(DV0P1460)

Motor Cable



Do not install it on E.

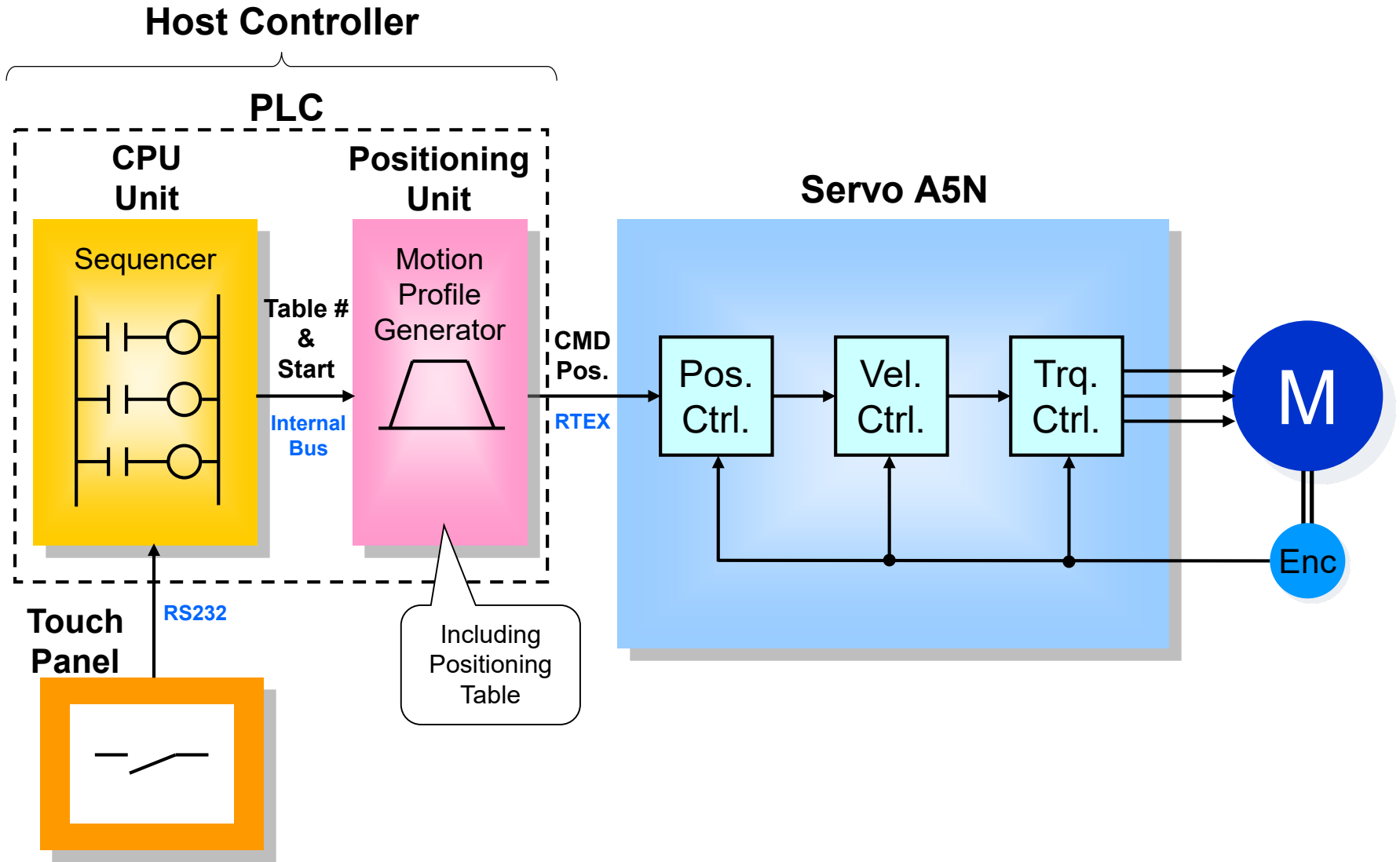


Stable Frame Ground

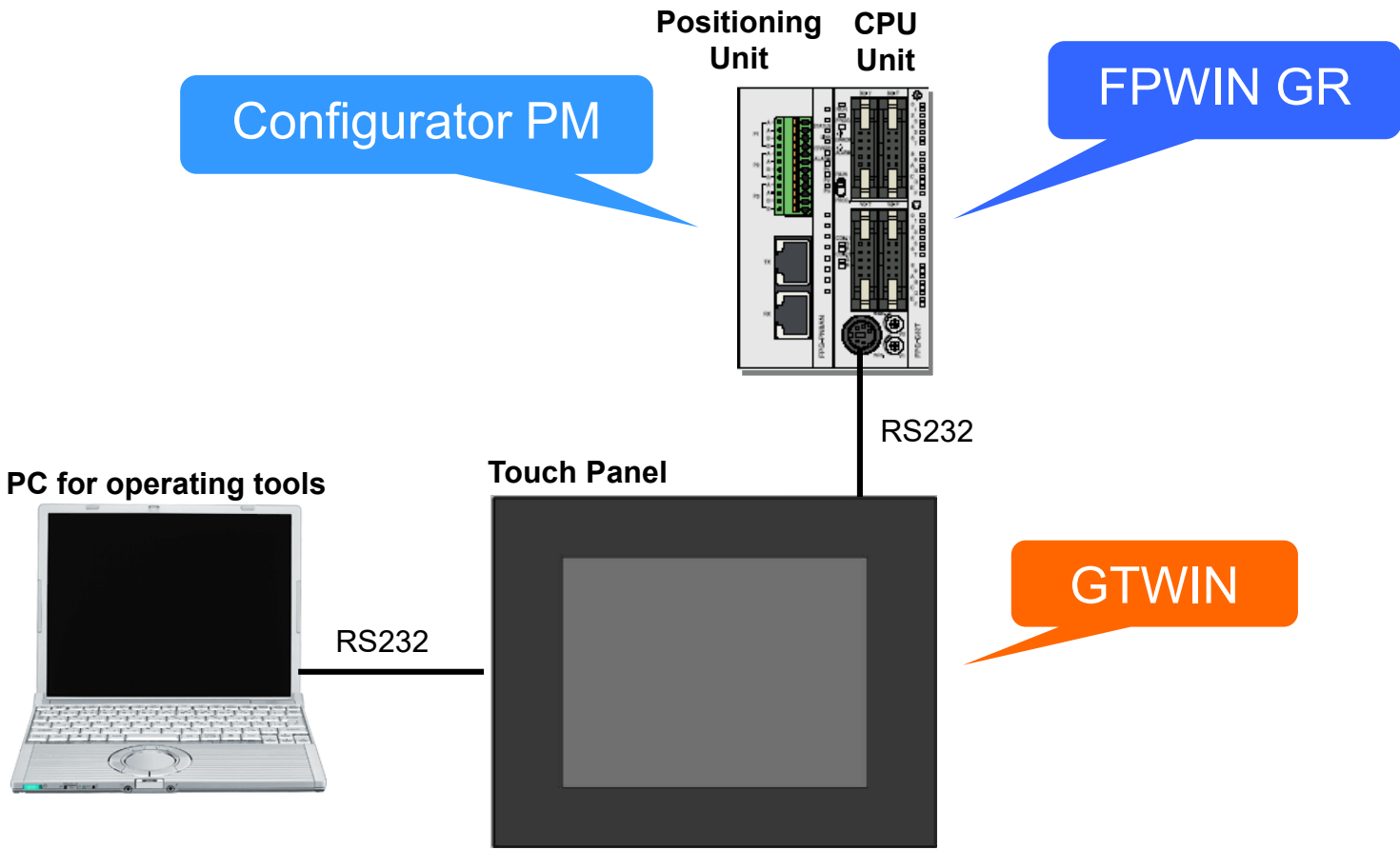
Make the back of chassis tightly contact earthed metal frame.
The surface of the metal frame must be kept conductive.

Host Controller Programming

Block Diagram



Programming Tools for Host Controller



Touch Panel Configuration

An example of start switch.

The image shows two overlapping windows from a touch panel configuration software. The top window, titled "スイッチ部品 No.1", is in the "基本設定" (Basic Settings) tab. It features several sections:

- 動作モード (Operation Mode):** Radio buttons for "ビットセット", "ビットリセット", "モーメントリ" (selected), and "オルタネイト". A text box next to "モーメントリ" contains "R150" and is circled in red.
- ON/OFF動作 (ON/OFF Action):** Radio buttons for "しない", "出力先と同一デバイスにする" (checked), "する", "SW押し下げ", and "デバイスの状態".

The bottom window, titled "0 (ベース画面) <A5N_demo_110516.IOP>", displays a control panel with the following elements:

- Servo ON/OFF:** A physical switch icon labeled "SW5".
- Alarm:** A red indicator light labeled "LP0" and a "CLR" button.
- Actual Pos./Vel./Trq.:** A table of data for two axes (#1 and #2).
- Other Indicators:** "LP3 Homing Complete" and "LP4n Progress" indicators.
- Buttons:** "HOMING" (green), "START" (blue), and "STOP" (red).

A red arrow points from the "R150" text box in the top window to the "START" button in the bottom window, indicating that the "R150" setting is associated with the start switch.

Axis	Parameter	Value	Unit
#1	DA0	*****	pulse
	DA1	*****	pulse
#2	DA4	*****	r/min
	DA5	*****	r/min
#1	DA6	*****	x 0.1%
	DA7	*****	x 0.1%

PLC Programming

Basically, start after setting table No.

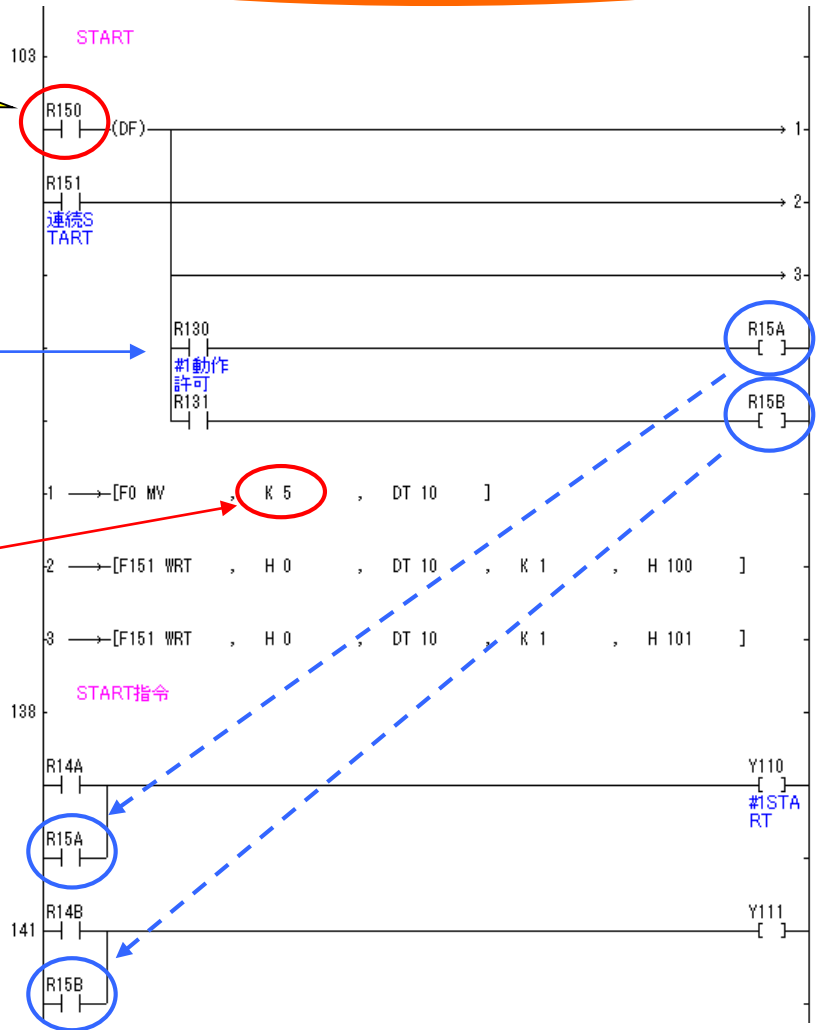
Start SW on the Touch Panel

R130 and 131 ON conditions:
 - RTEX established
 - Servo-ON
 - Not in motion

Table No.

Setting table No. into shared memory.

Servo #1 and #2 START



Note:
 R151, R14A and R14B
 are used for another program.

Positioning Unit Configuration (1)

Parameters of Positioning Unit:

パラメータ設定

	1軸	2軸
単位設定	P:pulse	P:pulse
1回転あたりのパルス数	1	1
1回転あたりの移動量	1	1
CW/CCW方向設定	0: CW方向+	0: CW方向+
リミットスイッチ	N:無効	N:無効
リミットスイッチ接続	S:標準	S:標準
ソフトリミット(位置決め制御)	N:無効	N:無効
ソフトリミット(原点復帰)	N:無効	N:無効
ソフトリミット(JOG運転)	N:無効	N:無効
ソフトリミット上限値	1073741823	1073741823
ソフトリミット下限値	-1073741823	-1073741823
補助出力モード ²	N:未使用	N:未使用
補助出力ON時間 (ms)	10	10
補助出力Delay比率 (%)	0	0
完了幅 (pulse)	10	10
モーター - トルク判定	N:無効	N:無効
モーター - トルク判定値 (%)	500.0	500.0

各軸の単位を指定します。
以下の内容から選択してください。
P:pulse, M:mum [Min 0.1], M:mum [Min 1], Inch [Min 0.00001], Inch [Min 0.0001], D:degree [Min 0.1], D:degree [Min 1]

Unit
of pulses per revolution
Direction
Limit setting
Homing type
etc...

OK キャンセル(C) 軸コピー 初期化(F) ヘルプ(H)

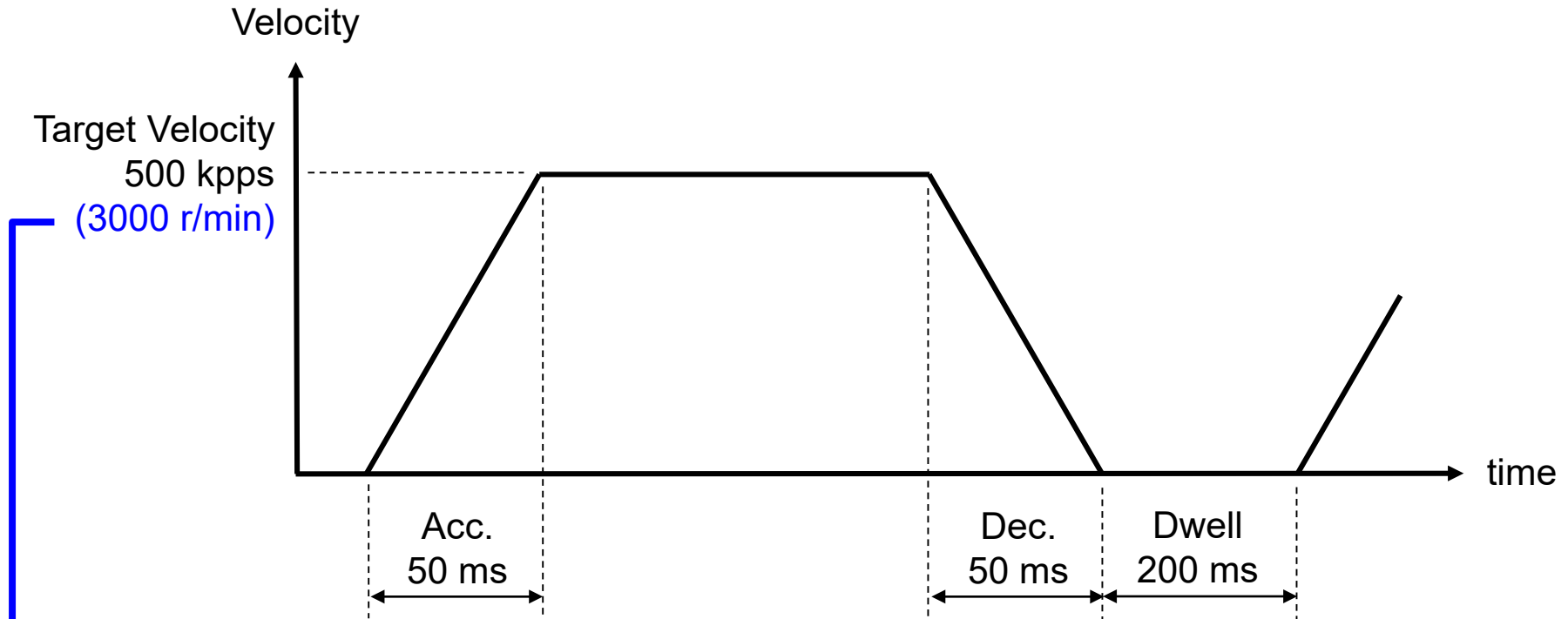
Positioning Unit Configuration (2)

Positioning Data Table:

Table No. →

テーブルNo.	運転パターン	制御方式	X軸(1)移動量	加減速方式	加速時間(ms)	減速時間(ms)	目標速度	ドwellタイム(ms)	補助出力	コメント
1	C: 継続点	A: アナログ	-2500	L: 直線	50	50	4000	0	0	原点復帰後の動作
2	E: 終了点	I: インクリメント	0	L: 直線	50	50	1000	0	0	
3	E: 終了点	I: インクリメント	0	L: 直線	50	50	1000	0	0	
4	E: 終了点	I: インクリメント	0	L: 直線	50	50	1000	0	0	
5	C: 継続点	I: インクリメント	10000	L: 直線	50	50	4000	200	0	通常動作
6	C: 継続点	I: インクリメント	-10000	L: 直線	50	50	4000	200	0	
7	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
8	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
9	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
10	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
11	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
12	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
13	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
14	C: 継続点	I: インクリメント	1250	L: 直線	50	50	500000	200	0	
15	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
16	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
17	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
18	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
19	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
20	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
21	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
22	C: 継続点	I: インクリメント	-1250	L: 直線	50	50	500000	200	0	
23	C: 継続点	I: インクリメント	500000	L: 直線	50	50	500000	200	0	

Motion Profile Example



A5N parameter setting is needed as follows:

Electronic Gear Setting: $\frac{1,048,576 \text{ (20 bit)}}{10,000}$
(Pr0.08 = 0, Pr 0.09 = 0, Pr 0.10 = 10000)

Servo Settings

A5N Front Panel



LINK LED (Green)

LINK	Network State
OFF	Wiring Not Link
Solid Green	Link

7-segment LED

COM LED (Green / Red)

COM	Network State
OFF	Initial
Blinking Green	In Configuration
Solid Green	Established
Blinking Red	Error
Solid Red	Serious Error (Reset needed)

Address Setting RSW

Range: 00 to 31

Value depends on the controller specification.

Node Address

Set the value according to Host Controller specification.
In FP Sigma of 2-axis type, set #1 and #2.



Note: Some Host Controllers need value corresponding to RTEX cable-connecting order.

RTEX Period

FP Sigma needs Update Period 1 ms, Com. Period 0.5 ms and 16-byte mode.

Pr7.20	Pr7.21	Command Update Period	Com. Period	Max # of Axes		Available Control Mode	Full-Closed Cont. (Note)
				16-byte mode Pr7.22 bit0=0	32-byte mode Pr7.22 bit0=1		
6	1	1.000 ms	1.000 ms	32	16	PP, CP, CV, CT	Available
3	2	1.000 ms	0.500 ms	32	16	PP, CP, CV, CT	Available
3	1	0.500 ms	0.500 ms	32	16	PP, CP, CV, CT	Available
1	1	0.166 ms	0.166 ms	10	-	CP, CV, CT	-
0	2	0.166 ms	0.083 ms	5	-	CP, CV, CT	-

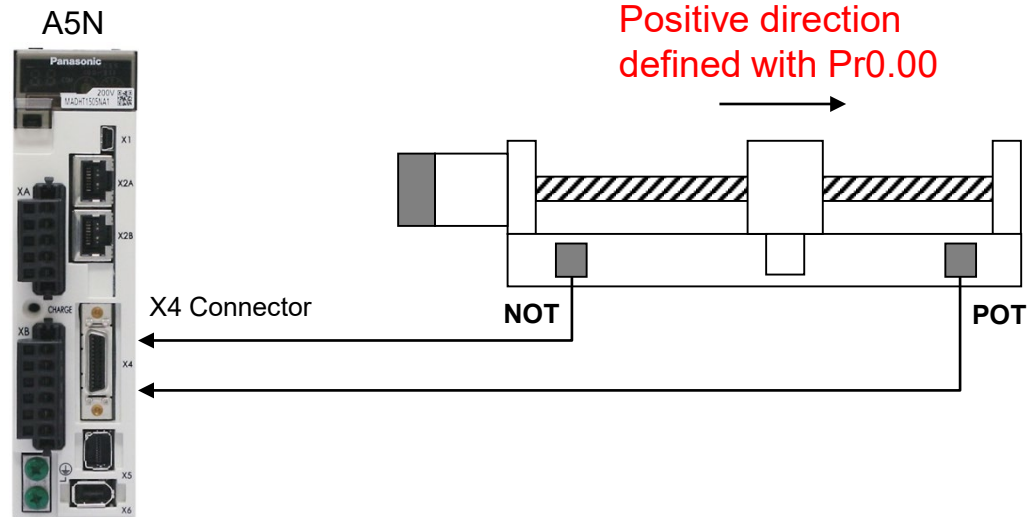
Note: Full-closed control Pr0.01 = 6, Semi-closed control Pr0.01 = 0

Using PANATERM, the command wave-form should be checked.
If the period is mismatched, the wave-form is disturbed.

Limit Sensors

According to Host Controller specification, set relevant parameters properly as well as wiring.

Normally Pr5.04 is set to 1 (disable) because Host Controller operates limit motion.



Response byte 3 inside RTEX data block:

		bit1	bit0
Pr7.23 bit3=0		POT	NOT
Pr7.23 bit3=1		NOT	POT

Bit assignment is changeable with Pr7.23.

A5N Parameter Setting

FP Sigma needs the following parameter settings.

There are some parameters FP Sigma changes automatically, and do not touch them.

#	Name	Setting Value	Description
0.00	Rotational direction	Do not touch.	FP Sigma operates it.
0.01	Control mode	0	Semi-closed control
0.08	Number of command pulses per motor revolution	0	Set by Pr0.10.
0.09	Numerator of electronic gear	0	Set by Pr0.10.
0.10	Denominator of electronic gear	(e.g.)10000	Set value of pulses per 1 rev. (Note1)
5.04	Over-travel inhibit input	1	Disable
5.21	Selection of torque limit	Do not touch.	FP Sigma operates it.
7.20	RTEX communication cycle	3	0.5 ms
7.21	RTEX command updating cycle ratio	2	Update : Com. = 2 : 1
7.22	RTEX function extended 1	0	16-byte
7.23	RTEX function extended 2	Do not touch	FP Sigma operates it.
7.25	RTEX speed unit	1 (Note2)	pulse/s

Notes:

1. If necessary, with adjusting position command filters (Pr2.22, Pr2.23), smooth out the position command after the electronic gear through.
2. If required to monitor speed with r/min, set Pr7.25 to 0.

Start-UP

Power-ON Sequence

It depends on Host Controller specification.
FP Sigma needs the following order.

1. I/O devices connected to PLC



2. Servo drives

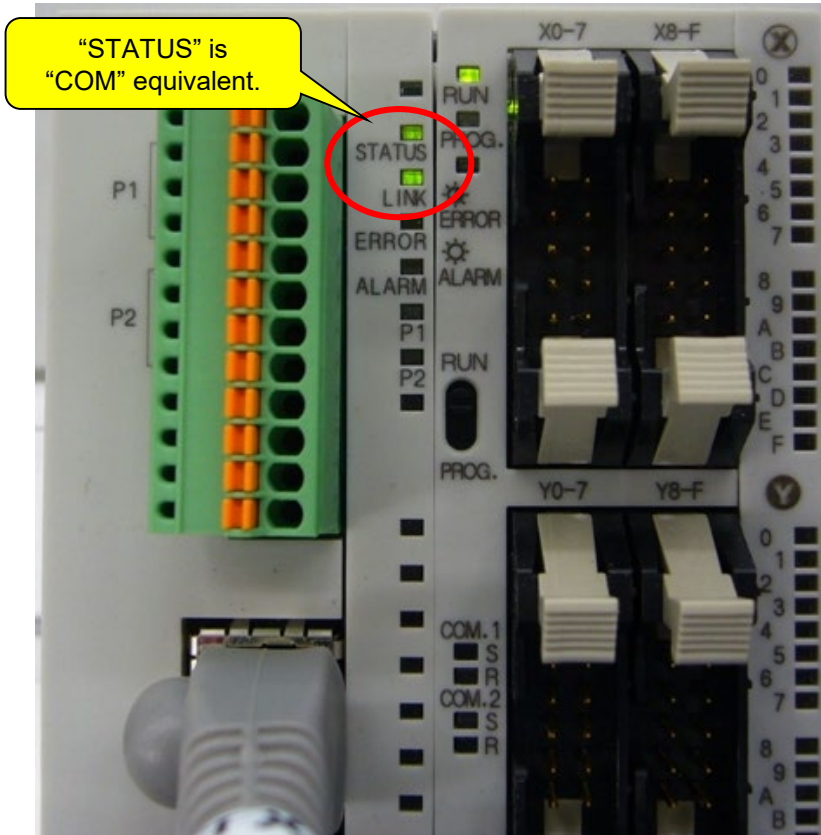


3. PLC FP Sigma

LED Checking in Power-ON

When RTEX established successfully, both LINK and COM indicate solid GREEN.

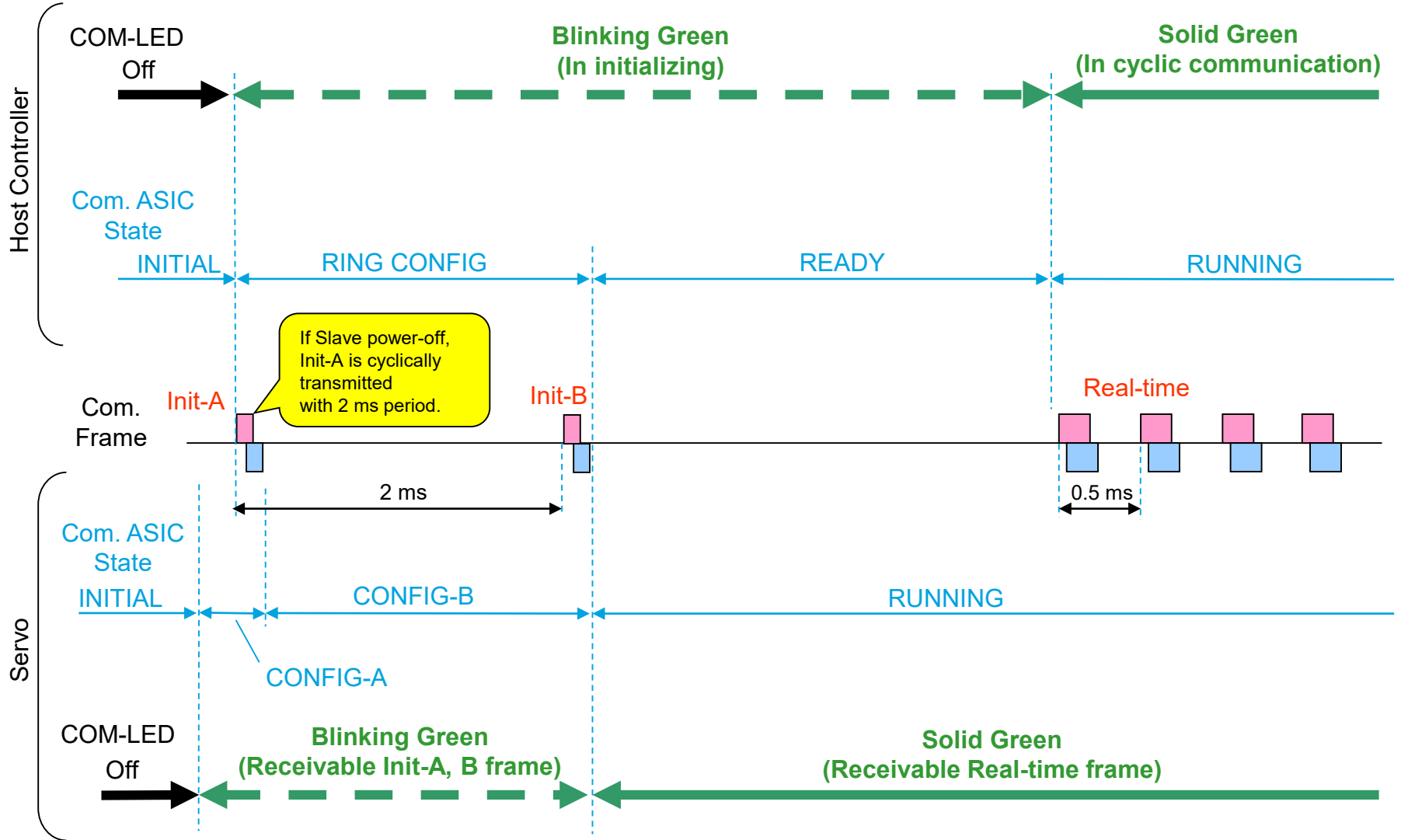
PLC "FP Sigma"



A5N



COM Behavior at Start-up



Panasonic
INDUSTRY