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APPLICATION NOTE

1. Touch Probe Registration

Digital Servo Drives often have a position capture function known either as Touch Probe or Touch Trigger. This function uses either the Z mark on the motor's encoder, or one of 2 external inputs to act as the latch signal and capture the encoder position in a register within the Servo Drive. Software in the bus master can access the captured position for use in the Motion Coordinator.

Touch Probe functions exist on EtherCAT, SERCOS and SLM/PLM drives. This document describes examples of drive-based registration using Touch Probe over EtherCAT. Operation requires firmware version 2.0215 or later.

2. Initialisation

2.1. Drive support

Drives supporting Touch Probe within the MC464 firmware are:

Panasonic Minas A5N

Yaskawa Sigma 5

2.2. MC_CONFIG

The correct DRIVE_PROFILE must be set in the MC_CONFIG file.

Panasonic Minas A5N (speed mode): DRIVE_MODE = 2, DRIVE_PROFILE=1

Panasonic Minas A5N (position mode): DRIVE_MODE = 1, DRIVE_PROFILE=1

3. Registration

Once the drive is initialised and running on the EtherCAT, the capture of positions is started by simply using the REGIST command in a program. REGIST function 20 is used and the parameters are set in the same way as for any other axis type with hardware registration.

3.1. Syntax:

REGIST(20, channel, source, edge, window)



channel:	0	Selects Touch Probe 1
	1	Selects Touch Probe 2
source:	0	Selects the External 24V input.
	1	Selects the Z mark.
edge:	0	Rising edge
	1	Falling edge
window:	0	No windowing
	1	Position must be inside OPEN_WINCLOSE_WIN
	2	Position must be outside OPEN_WINCLOSE_WIN

If channel = 0 then MARK, REG_POS and REGIST_SPEED are used

If channel = 1 then MARKB, REG_POSB and REGIST_SPEEDB are used

3.2. Drive connections

Panasonic Minas A5N has 3 sources for the touch probe function. The Z mark of the encoder, the input EXT1 on IO connector pin 10 and input EXT2 on IO connector pin 11. These external inputs are NPN active Low, with a common 24V terminal on IO connector pin 6.

Set channel to 0 and source to 0 for EXT1

Set channel to 1 and source to 0 for EXT2

Set source to 1 for Z



If you want to use Z mark of the encoder and an external input you have to use both Touch probes, one for Z mark and the other one for the external input.

To use touch probe you must to set up drive profile = 2 in MC CONFIG FILE

The pin connections, the picture and the drive profile is just for Panasonic model MADHT1505B02.



4. Example program

This program sets up the touch probe and saves the captured position for use later.

```
' Using the touch probe function on the drive.
  ' Drive is set up with profile to enable touch-probe over EtherCAT.
  ' Set appropriate DRIVE PROFILE in MC CONFIG
  GOSUB vars
  BASE(0)
  UNITS=1
  SPEED=1000000
  ACCEL=SPEED*10
  DECEL=SPEED*10
  SERVO=ON
  WDOG=ON
  WA(100)
  ' REGIST(20, channel, source, edge, window)
  ' Touch probe requires source 0:EXT1, 1:Z, 2:EXT2
  REGIST(20, chan a, src 1, edge r, no window)
  IF MTYPE=0 THEN
    FORWARD
  ENDIF
  WAIT UNTIL MARK
  CANCEL
  PRINT REG POS
  OFFPOS=-REG POS
  STOP
vars:
  chan a=0
  chan b=1
  src 1=0
  src z=1
  src 2=2
  edge_r=0
  edge_f=1
  no window=0
  inside window=1
  outside window=2
RETURN
```



This program sets up the touch probe 1 for Z mark and touch probe 2 for EXT2 and saves the captured position for use later. Remember, EXT2 is pin 11. Connect pin 6 to 24v and when EXT2 is connected to 0v then is ON.

```
GOSUB vars
BASE(0)
UNITS=1000
SPEED=1
ACCEL=SPEED*10
DECEL=SPEED*10
SERVO=ON
WDOG=ON
WA(100)
' REGIST(20, channel, source, edge, window)
' Touch probe requires source 0:EXT1, 1:Z, 2:EXT2
REGIST(20, chan a, src z, edge r, no window)
IF MTYPE=0 THEN
 FORWARD
ENDIF
WAIT UNTIL MARK
CANCEL
PRINT REG_POS
WAIT IDLE
REGIST(20, chan b, src 1, edge r, no window)
REVERSE
WAIT UNTIL MARKB
CANCEL
PRINT REG POSB
OFFPOS=-REG POSB
STOP
vars:
chan a=0
chan b=1
src 1=0
src z=1
src<sup>2</sup>=2
edge r=0
edge_f=1
no window=0
inside_window=1
outside_window=2
RETURN
```



5. Notes

5.1. DATUM on Z

As the DATUM(1) and DATUM(2) commands use the firmware functions for REGIST on a Z mark, the use of the Touch Probe profile on an EtherCAT drive automatically means that the DATUM(1) and DATUM(2) will function.