TouchProbe CDD 3000

Date:	05.07.2004
CDD Software Version:	from V2.20

Index:

1TouchProbe-Function

The TouchProbe-Function is for storing the position actual value in realtime. By means of a flange at one of the both digital standard inputs ISD03 or ISD04 of CDD3000 the storing of the position actual value can be started. Cycle-time is 62.4 µsec. At 3000 rpm it corresponds to a maximum error of 1.12°.

Activating the trigger input and read-out the stored position will be effected via the commands of the iMotion-process program. The commands contain the following functions:

- Activating the trigger input
- Waiting until input starts storing of the position actual value
- Read-out and assign of the stored position value
- Positioning commands, calculating the stored value as offset
- Positioning commands, calculating the difference position of both trigger inputs ISD03 and IS04

Syntax of this commands will be explained in the following chapters, the handling of these commands is shown at appropriate examples.

2Syntax of TouchProbe-Commands

2.1Activate TouchProbe

2.1.1Activate TouchProbe (with position actual values)

In order to prepare storing of the position actual value via a positive or negative flank at the input TouchProbe 3 for digital input ISD03 or TouchProbe 4 for digital input ISD04 must be activated by means of a SET-command.

Trigger F0 for the positive and F1 for the negative flank of the input.

SET TP3/4 G1 F0/1

TP3/4 : TP3 = TouchProbe Input ISD03 / TP4 = TouchProbe Input ISD04

G1 : Position encoder, cannot be changed

F0/1 : F0 = positive flank; F1 = negative flank)

2.1.2Activate TouchProbe (with References)

direct: SET TP3/4 = X,Hxx

indexed: SET TP3/4 = H[Cxx]

TP3/4 : TP3 = TouchProbe Input ISD03 / TP4 = TouchProbe Input ISD04

X : Position [Way units]

Hxx : Variables H00 up to H99

H[Cxx] : Variables, indexed by counter C00 up to C99

The set command itself triggers the TouchProbe.

2.2Set variables via TouchProbe-Position (no round table)

direct: SET Hxx = TP3/4

indexed: SET H[Cxx] = TP3/4

TP3/4 : TP3 = TouchProbe Input ISD03 / TP4 = TouchProbe Input ISD04

Hxx : Variables H00 up to H99

H[Cxx] : Variable, indexed by counter C00 up to C99

2.3Jump, depending on TouchProbe-Conditions

JMP (TP3/4 = 0/1) Ny/END/Pxx

TP3/4 : TP3 = TouchProbe Input ISD03 / TP4 = TouchProbe Input ISD04

0/1 : 0 = TouchProbe not started / 1 = TouchProbe started

Ny/END/Pxx : Ny = Set number (000 ... 999)
END = End of program
Pxx = Program number (00-99)

2.4Waiting, depending on TouchProbe-Condition

Program continuously after starting of storing.

WAIT TP3/4

TP3/4 : TP3 = TouchProbe Input ISD03 / TP4 = TouchProbe Input ISD04

2.5Positioning with TouchProbe

2.5.1Positioning with TouchProbe and Offset (trigger positioning)

Process with continuation GO A TP3/4 x Vy

GO A TP3/4 Hxx Vy

GO A TP3/4 x Hyy

GO A TP3/4 Hxx Hyy

Process w/o continuation GO W A TP3/4 x Vy

GO W A TP3/4 Hxx Vy

GO W A TP3/4 x Hyy

GO W A TP3/4 Hxx Hyy

TP3/4 + (x,Hxx) = Target position
x : Position / Hxx : Position in variables H00 up to H99

V(y,Hyy) = Axis moves with this speed to the calculated target position:
y : speed / Hyy speed in variables H00 up to H99

2.5.2Positioning on difference of TouchProbe TP3 and TP4

This relative positioning command „GORD TPc$_1$ – TPc$_2$ x y“ or „GOWRD TPc$_1$ – TPc$_2$ x y“ is for keeping the requested difference x between TP4 and TP3.

x = (TP4 – TP3) => x – (TP4 – TP3) = 0

x – (TP4 – TP3) : Relative way of positioning, if TP4 – TP3 > x a negative move will be made.

Example:

Process with continuation: GO R D TPc$_1$-TPc$_2$ x Vy

GO R D TPc$_1$-TPc$_2$ Hxx Vy

GO R D TPc$_1$-TPc$_2$ x Hyy

GO R D TPc$_1$-TPc$_2$ Hxx Hyy

Process w/o continuation GO W R D TPc$_1$-TPc$_2$ x Vy

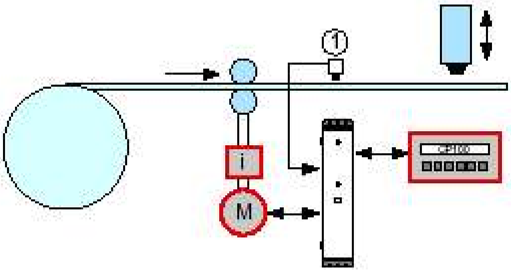
GO W R D TPc$_1$-TPc$_2$ Hxx Vy

GO W R D TPc$_1$-TPc$_2$ x Hyy

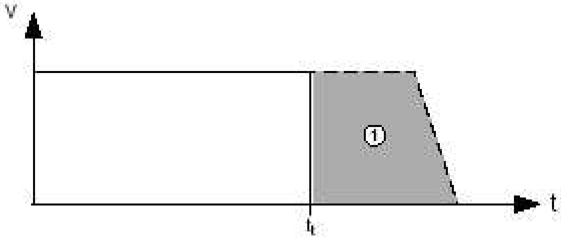
GO W R D TPc$_1$-TPc$_2$ Hxx Hyy

3Example

3.1Trigger-Positioning with TouchProbe (break-down)



Picture 1: Triggered advance (1) marker sensor



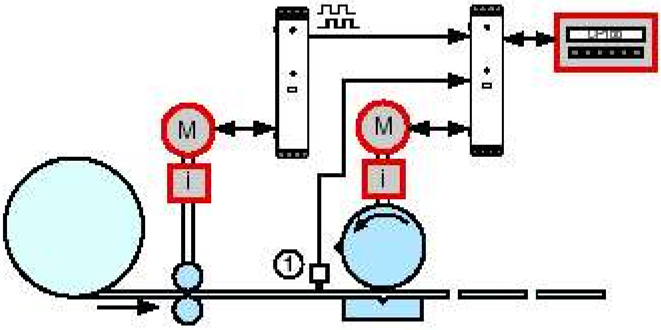
Picture 2: Trigger-Positioning tt = Trigger time (1) way of positioning

1. Axis runs with a positioning command, synchronous run is inactive.
2. TouchProbe will be activated (SET TP4 G1 F0).
3. Waiting for TouchProbe-Signal WAIT TP4
4. Trigger-Signal at digital input IS04 starts storing the actual position.
5. Command GOA TP4 11 V30 interrupts the prior positioning command. New target position is TP4 + 11. Moving to target position by means of keeping the speed 30 and under consideration of the adjusted ramps.
6. Released error and interruption of process program if there is no trigger signal at time of processed command GO TP1R x Yy and no storing of actual position, too.

Program example:

```
%P00(TPCutting)
N010 SET 0              ; set reference
N020 GO V30             ; go with constant speed
N030 SET TP4 G1 F0      ; activate touch-probe ( rising edge at digital input IS04)
N040 WAIT TP4           ; wait for trigger
N100 GOA TP4 11 V30     ; go to Position ( 11 + TP4)   with speed  30
N110 WAIT ST            ; wait until standstill-window is reached
N120 SET 0S02=1                 ; activate cutting
N130 JMP N020           ; do it again
END
```

3.2Marker synchronization



Picture 3 Marker Synchronization

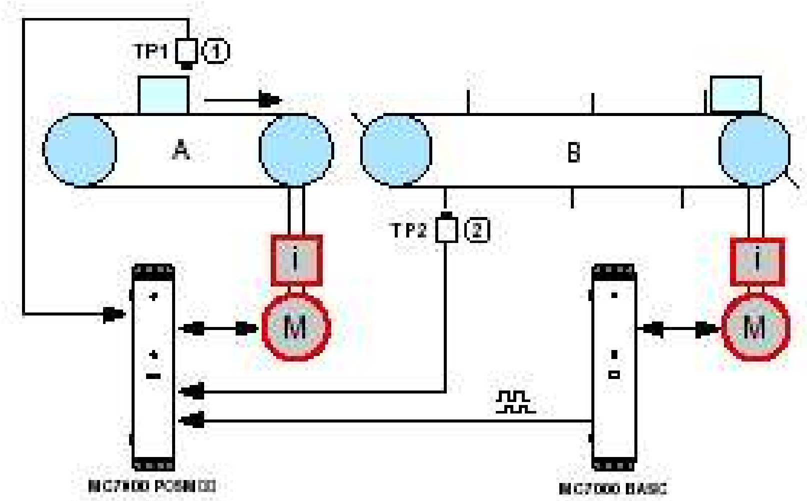
Program example:

```
%P00(TPTagsync)
N004 SET 0                     ; Set Reference
N005 GOSYN1                    ; activate electronic gear
N010 SET TP3=0                 ; set position of TouchProbe3 = 0
N020 SET TP4 G1 F0             ; activate TouchProbe4 (IS04, rising edge)
N040 WAIT TP4                  ; wait for trigger of TouchProbe4
N100 GO R D TP3-TP4  20 V30 ; go  relative = 20 – (TP4 – 0) with speed  30
N410 JMP N020
END
```

3.3Synchronization of conveyors

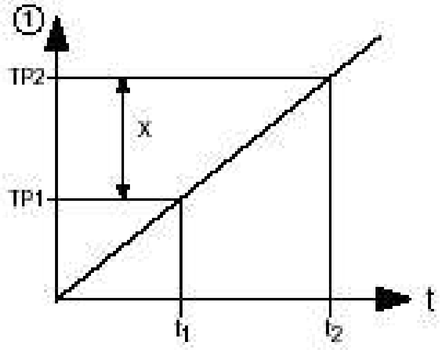
This kind of positioning can be used for synchronization of two conveyors.

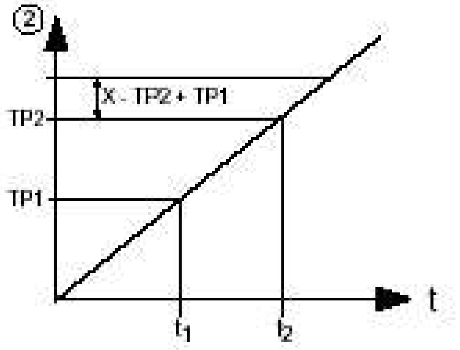
Picture: Synchronization of conveyors



1) Marker sensor, (2) Fan sensor

Master CDD3000 will be operated speed-controlled and delivers the encoder simulation to the slave CDD3000. At this the synchronous run is active and it stores the actual positions of both Touch-Probes. Difference TP4 – TP3 shall be x. If this is not so, it will be balanced via a relative positioning of conveyor A.





Relative way = x – (TP4 – TP3)

Picture (1): optimum arrival time for both TouchProbes.

Picutre (2): Touchprobe 2 too early

Command GO R D TP3-TP4 20 V30 relocates the synchronous position of conveyor A in order to be in reference state again.

```
%P00(TPClustering)
N010 SET 0               ; set reference
N020 GOSYN1              ; activate electronic gear
N030 SET TP4 G1 F0       ; activate TouchProbe 4  (digital input IS04, rising edge)
N040 SET TP3 G1 F0       ; activate TouchProbe3  (digital input IS03, rising edge)
N050 WAIT TP4            ; wait for trigger of TouchProbe4
N050 WAIT TP3            ; wait for trigger of TouchProbe3
N100 GO R D TP3-TP4  20 V30 ;   go relative (position = 20 – (TP4 – TP3)) with speed  30
N110 JMP N030
END
```

3.4Send TouchProbe-Position via CAN

As soon as the TouchProbe-Position is stored in parameter (793-TPPOS) it can be sent via TX-PDO.

Therefore register digital input IS03 or IS04 as event for sending the parameters (148-TXEV1; 149-TXEV2; 628-TXEV3; 629-TXEV4). In the corresponding TX-PDO's index 3 of parameters (793-TP-POS) for TouchProbe 3 resp. index 4 for TouchProbe 4 is mapped. Via changing the state of the TouchProbe input the assigned TXPO will be sent.

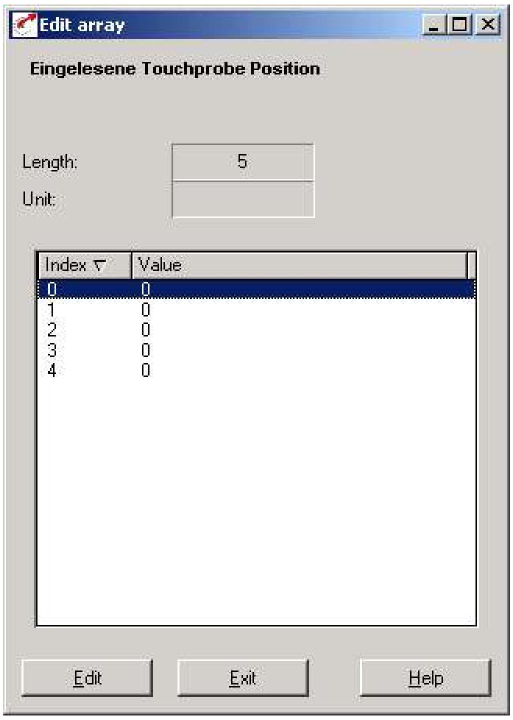
4Parameter

4.1 793-TPPOS- Read-in TouchProbe Position

Index 3 is the visualization of the position of TouchProbe 3.

Index 4 is the visualization of the position of TouchProbe 4.

All other indexes are always 0.



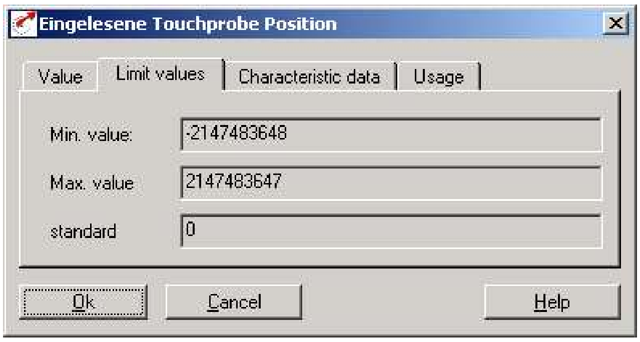
Edit array

Eingelesene Touchprobe Position

Length: 5

Unit:

Index ▽	Value
0	0
1	0
2	0
3	0
4	0

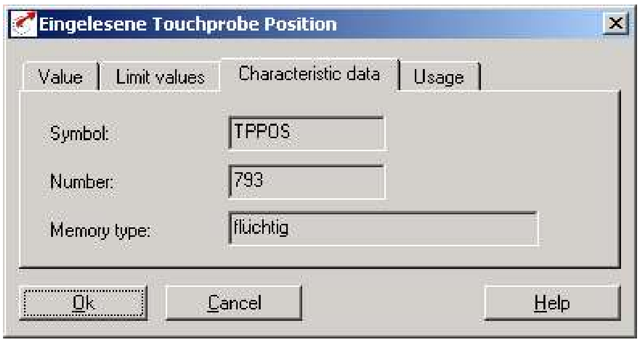


Eingelesene Touchprobe Position

Min. value: -2147483648

Max. value 2147483647

standard 0

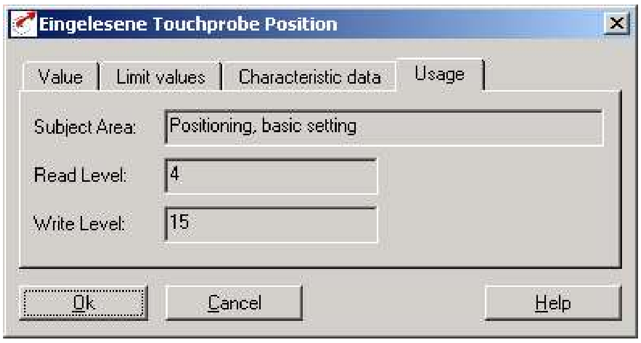


Eingelesene Touchprobe Position

Symbol: TPPOS

Number: 793

Memory type: flüchtig



Eingelesene Touchprobe Position

Subject Area: Positioning, basic setting

Read Level: 4

Write Level: 15