16CH STEPPING MOTOR CONTROLLER

ＰＭ１６Ｃ－０４ＸＤ(Ｌ)

USER'S MANUAL

(FOR REMOTE CONTROL)

2658, 2735 (V2/090928=V10JP)

APPLICATION OF ELECTRONIC DEVICES

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COMMAND LIST (LAN,RS232C,GP-IB)

x:0～F(motor)　dd･･･d:decimal data

MODE	COMMAND	NOTE
R	ABSx±ddddddddddd	absolute index scan
R	ABSxB±ddddddddddd	absolute index scan, both dir. backlash reject
R	ABSxS±ddddddddddd	absolute index scan, single dir. backlash reject
R	ASSTP,AESTP	all moving motor slow stop or fast stop
R	BLx±ddddddd	set backward digital limit
R/L	BL?x	read backward digital limit reply: ±ddddddd(decimal)
R	CSCANPx,CSCANNx	constant speed scan to cw or ccw direction
R	FDHPx	find home position(start auto find sequence)
R	FLx±ddddddd	set forward digital limit position
R/L	FL?x	read forward digital limit reply: ±ddddddd(decimal)
R	GTHPx	go to home position if it exists
R	JOGPx,JOGNx	Jog command(one step to cw or ccw direction)
R	LOC	Local mode change
R/L	LS?	LS read　reply: abcdHJKL
R	PAUSE ON, PAUSE OFF, PAUSE?	set pause, clear pause, read out/reply: ON or OFF
R	PSx±ddddddd	preset position data
R/L	PS?x	read position data reply: ±ddddddd(decimal)
R	RELx±ddddddddddd	relative index scan
R	RELxB±ddddddddddd	relative index scan,both dir.backlash remove
R	RELxS±ddddddddddd	relative index scan,single dir.backlash remove
L	REM	Remote mode change
R	RTExddd	acc. rate set　ddd: 0～115(see rate table p　)
R/L	RTE?x	read acc. RATE　reply: ddd
R	SABSx±ddddddd	set abs pos data for local mode
R/L	SABS?x	read abs pos data for local mode reply:±ddd･･･dd
R	SACTxY	set active for local Y: 0/non active 1/active
R/L	SACT?x	read active for local reply: 0 or 1
R	SCANHPx,SCANHNx	accelerative scan to cw or ccw direction if HP switch then stop
R	SCANPx,SCANNx	accelerative scan to cw or ccw direction
R	SETHPx0XYZ	HP find information set X: found/1,not found/0 Y: found dir. 0/cw,1/ccw Z: auto start dir. 0/cw,1/ccw
R/L	SETHP?x	read HP find information reply: 0XYZ
R	SETJGxdddd	set Jog pulse for manual PB
R/L	SETJG?x	read JOG pulse for manual PB　reply: DDDD
R	SETLSxDYYY0Yyyy	se LS characteristics D: digital limit enable/1, disable/0 Y: LS enable/1, disable/0 y: LS N.C/1, N.O/0
R/L	SETLS?x	read LS setting　reply: DYYY0YYY(see SETLSx)
R	SETMTxABCD	motor drive set A: 1/drive enable 0/disable B: 1/hold on　0/hold off C: 0/const　1/trapezoidal 2/S character D: 0/Pulse-Pulse 1/Pulse-Direction 2/PDR

MODE	COMMAND	NOTE
R/L	SETMT?x	read motor set reply: ABCD
R	SHPx±ddddddd	set home position data
R/L	SHP?x	read home position reply: ±ddddddd or NO H.P
R	SHPFxdddd	set home position offset
R/L	SHPF?x	read home position offset reply: dddd
R	SPCxdddd···	change speed while moving (1～5,000,000)
R	SPDHx,SPDMx,SPDLx	change speed
R/L	SPD?x	read speed reply: HSPD or MSPD or LSPD
R/L	SPDAL?	active axis and their set speed read reply: abcd/Hxxxxxxx/Mxxxxxxx/Lxxxxxxx/Hxxxxxxx (busy axis will reply "000000")
R	SPDHxdddd···	set HSPD to ddd··· in pps unit(1～5,000,000)
R/L	SPDH?x	read HSPD reply: dddddd
R	SPDLxdddd···	set LSPD to ddd··· in pps unit(1～5,000,000)
R/L	SPDL?x	read LSPD reply: dddddd
R	SPDMxdddd···	set MSPD to ddd··· in pps unit(1～5,000,000)
R/L	SPDM?x	read MSPD reply: dddddd
R	SPRSx±ddddddd	set preset data for local mode
R/L	SPRS?x	read preset data for local mode reply:±DDD···DD
	SRELx±ddddddd	set rel pos data for local mode
R/L	SREL?x	read rel pos data for local mode reply:±DDD···DD
R/L	SRQx1	SRQ flag set auto reset after SRQ out
	SRQx0	SRQ flag reset
	SRQ?x	SRQ flag read reply: 1 or 0
R	SSTPx,ESTPx	slow stop or fast stop
R	STOPMDxAB	set PB and LS stop mde A: 0/LS slow stop 1/LS fast stop B: 0/PB slow stop 1/PB fast stop
R/L	STOPMDx?	read PB & LS stop mode reply: AB A,B: 0,1
R/L	STQ?	Remote/Local mode and moving motor information reply: Rn or Ln n: 0 ～ 4 moving motor number (if n = 4 then you can't start another motor)
R/L	STS?	Status read out reply: R(L)abcd/PNNS/VVVV/HHJJKKLL/±uu···/±vv···/±ww···/±xx···/ PNNS: P: cw moving N: ccw moving S: stopped VVVV:LS status & hold off status HH,JJ,KK,LL: mcc status uu···,vv···,ww···,xx··· : current position
R	TMGEx±ddddddd	timing out end point set
R/L	TMGE?x	read timing out end point reply: ±DDD···DD
R	TMGIxddddddd	timing out interval step set
R/L	TMGI?x	read timing out interval step reply: DDD···DD
R	TMGMxY	timing out mode set Y: 0/disable 1/gate 2/200ns 3/10us 4/100us 5/1ms pulse out
R/L	TMGM?x	read timing out mode reply: 0 ～ 5
R	TMGRx TMGCx	timing out ready set or ready clear
R/L	TMGR?x	read timing ready reply: YES or NO
R	TMGSx±ddddddd	timing out start point set
R/L	TMGS?x	read timing out start point reply: ±DDD···DD

MODE	COMMAND	NOTE
R	(Continuous) interpolation function command A pair of position controller A,B or position controller C,D is available "C0･･･" command is to use controller A,B pair "C1･･･" command is to use controller C,D pair Speed of synthesis depend on the motor that is set to A,C controller	
R	C0ALNab±xx･･･/±yy･･･ C1ALNab±xx･･･/±yy･･･	absolute address a,b axis straight line interpolation to the destination. a,b: 0～F xx･･･,yy･･･: decimal under 9 digit
R	C0RLNab±xx･･･/±yy･･･ C1RLNab±xx･･･/±yy･･･	relative address a,b axis straight line interpolation to the destination a,b: 0～F xx･･･,yy･･･: decimal under 9 digit
R	C0ACPab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1ACPab±xx･･･/±yy･･･/±uu･･･/±vv･･･	absolute address a,b axis cw direction circular interpolation with center position data. a,b: 0～F x,y: destination u,v:center position x･･･,y･･･,u･･･,vv･･･: decimal under 9 digit perfect circle interpolation will be done by setting the destination to current position.
R	C0ACNab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1ACNab±xx･･･/±yy･･･/±uu･･･/±vv･･･	absolute address a,b axis ccw direction circular interpolation with center position data. another data are same as above.
R	C0RCPab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCPab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis cw direction circular interpolation with center position data. a,b: 0～F x,y: destination u,v:center position x･･･,y･･･,u･･･,vv･･･: decimal under 7 digit perfect circle interpolation will be done by setting the destination to (0,0) position.
R	C0RCNab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCNab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis ccw direction circular interpolation with center position data. another data are same as above.
R	C0AACab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1AACab±xx･･･/±yy･･･/±uu･･･/±vv･･･	absolute address a,b axis circular interpolation with bypass point data. a,b: 0～F x,y: destination u,v: bypass point x･･･,y･･･,u･･･,vv･･･: decimal under 9 digit
R	C0RACab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RACab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis circular interpolation with bypass point data. a,b: 0～F x,y: destination u,v: bypass point x･･･,y･･･,u･･･,vv･･･: decimal under 7 digit
R	C0ACCab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1ACCab±xx･･･/±yy･･･/±uu･･･/±vv･･	absolute address a,b axis perfect circle interpolation with two bypass point data. a,b:0～F x,y:bypass point 1 u,v:bypass point 2 x･･･,y･･･,u･･･,vv･･･: decimal under 9 digit
R	C0RCCab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCCab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis perfect circule interpolation with two bypass point data. a,b:0～F x,y:bypass point 1 u,v:bypass point 2 x･･･,y･･･,u･･･,vv･･･ : decimal under 7 digit

New added command.
V1.13～

MODE	COMMAND	NOTE
R	(Auto change scan command) ACSxyyy/PNT/JJJ‥J/FNC/LLL‥L	set data command x : channel 0,1,2,･･･,9,A,B,C,D,E,F yyy: sequence number 0 to 127max PNT: END should be written at next to end seq. : ADD relative address from start point : TIM relative time from previous point : ACC speed data while acceleration : DEC speed data while deceleration JJJ: relative address ±2,147,483,647max : time 0 to 65,535ms FNC: SPD LLL･･･L means speed data in pps : RTE LLL･･･L means rat data : SLW slow stop : FST fast stop : NOP no operation(skip this seq. number) LLL: speed 1 to 5,000,000pps : rate rate data number in the same range
R	ACS?xyyy	data read command x : channel 0,1,2,･･･,9,A,B,C,D,E,F yyy: sequence number 0 to 127max reply: xyyy/PNT/JJJ･･･J/FNC/LLL･･･L
R	ACSPx	auto change scan ready set command
R/L	ACSP?x	auto change scan ready read command reply: ready, not ready
R	ACSCx	auto change scan ready clear command
R	PAUSE ON PAUSE?	send before scan start command reply ON or OFF
R	ABSx(B)±ddddddddd RELx(B)±ddddddddd SCANPx SCANNx	auto change scan start command when the axis is auto change scan ready
R	PAUSE OFF	send after scan start command for synchronous scan start of multi channels

V1.14～

MODE	COMMAND	NOTE
R/L	HDSTLS?	hard and soft limit sw read reply: abcdHHHHSSSS abcd/ch, HHHH/hard SSSS/soft
R	SETCHabcd	set ch a,b,c,d to control window A,B,C,D position a,b,c,d: 0～9,A,B,C,D,E,F(HEX) "-" not changed.
R/L	SETCH?	read channel setting to current control A,B,C,D

V1.17～

MODE	COMMAND	NOTE
R/L	HOLD?x	hold on/off state read x:ch(0,1,･･･9,A,B,C,D,E,F) reply: ON or OFF
R	HOLDxON HOLDxOFF	hold on set to ch x hold off set to ch x

FOR MAINTENANCE

MODE	COMMAND	NOTE
R/L	ACSK?x Auto change scan data read	reply aabb,hhhh,hhhh aa: code(00:END,01:ADD,02:TIM,80:ACC,81:DEC) bb: sequence number(0 to 7F) hh･･･hh: data
R/L	ACSH?x Auto change scan data read	reply aabb,hhhh,hhhh aa: code(00:SPD,01:RTE,02:SLW,03:FST,0F:NOP) bb: sequence number(0 to 7F) hh･･･hh: data
R/L	FROM0, FROM1	FROM select
R/L	FROM?	current FROM read reply: FROM0,FROM1
R	REST	restart without power off-on
R/L	STSM?	read status port1 of MCC06 aaaa/bbbb/cccc/dddd
R/L	VER?	read version reply: 1.00 06-10-14 PM16C-04X
R/L	VERH?	hardware version read reply: HD-VER0,1,2,5,6

Existing commands below are available to PM16C-04XD and PM16C-04XDL.

OLD COMMAND LIST

COMPATIBLE TO PM16C-02N,-02Z,-04,-04S

MODE	COMMAND	NOTE
R/L	S 1 R	remote mode change
R/L	S 1 L	local mode change
R/L	S 1 0	R□□□□ motor channel No. reply of "A, B, C, D" for -04 type R□□ motor channel No. reply of "A, B" for -02 type
R	S 1 1□	set motor channel □ to A
	S 1 2□	set motor channel □ to B
	S 1 3 0 1	SRQ set when A motor stopped
	S 1 3 0 2	SRQ set when B motor stopped
	S 1 3 0 4	SRQ set when C motor stopped
	S 1 3 0 8	SRQ set when D motor stopped
	S 1 3 0 F	SRQ when A,B,C,D motor stopped (combination available)
	S 1 3 8 0	SRQ cancel (also with GP-IB COMMAND "IFC")
R/L	S 1 4	SRQ flag read R□□ (HEX)
R	S 1 5□	set motor channel □ to C
	S 1 6□	set motor channel □ to D
R/L	S 2 0	A position data read reply: R□□□□□□ (HEX)
	S 2 0 D	A position data read reply: ±DDDDDDDD (DEC)
	S 2 1	A position status read reply: R□□ (HEX)
	S 2 2	B position data read reply: R□□□□□□ (HEX)
	S 2 2 D	B position data read reply: ±DDDDDDDD (DEC)
	S 2 3	B position status read reply: R□□ (HEX)
	S 2 4	C position data read reply: R□□□□□□ (HEX)
	S 2 4 D	C position data read reply: ±DDDDDDDD (DEC)
	S 2 5	C position status read reply: R□□ (HEX)
	S 2 6	D position data read reply: R□□□□□□ (HEX)
	S 2 6 D	D position data read reply: ±DDDDDDDD (DEC)
	S 2 7	D position status read reply: R□□ (HEX)
R	S 3 0□□	A position 2 byte command □□ : command 08: +jog, 09: -jog 0C: +CSPD scan 0D: -CSPD scan 0E: +scan 0F: -scan 16: pause on 17: pause off 18: hold off 19: hold on 1E: +scan & HP stop 1F: -scan HP stop 40: slow stop 80: EM.stop
	S 3 1□□	B position 2 byte command □□ : command 08: +jog, 09: -jog 0C: +CSPD scan 0D: -CSPD scan 0E: +scan 0F: -scan 16: pause on 17: pause off 18: hold off 19: hold on 1E: +scan & HP stop 1F: -scan HP stop 40: slow stop 80: EM.stop
	S 3 2 X X X X X X □□ OR S 3 2 X X X X X X □□ B	A position 8 byte command X X X X X X: HEX position data □□: command 10: CSPD REL.IDX 11: CSPD ABS.IDX 12: REL.IDX 13: ABS.IDX auto backlash correction with "B"
	S 3 2□ ±DDDDDDD or S 3 2□ ±DDDDDDDB	A position DEC index command * □: A: absolute index scan, R: relative index scan ±DDDDDDD: DEC position data auto backlash correction with "B"
	S 3 3 X X X X X X □□ OR S 3 3 X X X X X X □□ B	B position 8 byte command X X X X X X: HEX position data □□: command 10: CSPD REL.IDX 11: CSPD ABS.IDX 12: REL.IDX 13: ABS.IDX auto backlash correction with "B"

ﾓｰﾄﾞ	コマンド	応　答　内　容
R	Ｓ３３□ ±DDDDDDD or Ｓ３３□ ±DDDDDDDB	B position DEC index command □:　A:　absolute index scan, R:　relative index scan ±DDDDDDD: DEC position data auto backlash correction with "B"
	Ｓ３□	speed change S34: L SPEED　S35: M SPEED　S36: H SPEED
	Ｓ３８□□	C position 2 byte command □□: command 08: +jog,　09: -jog　0C: +CSPD scan　0D: -CSPD scan 0E: +scan　0F: -scan　16: pause on　17: pause off 18: hold off　19: hold on　1E: +scan & HP stop　1F: -scan HP stop 40: slow stop　80: EM.stop
	Ｓ３９□□	D position 2 byte command □□: command 08: +jog,　09: -jog　0C: +CSPD scan　0D: -CSPD scan 0E: +scan　0F: -scan　16: pause on　17: pause off 18: hold off　19: hold on　1E: +scan & HP stop　1F: -scan HP stop 40: slow stop　80: EM.stop
	ＳＡＸＸＸ ＸＸＸ□□ OR ＳＡＸＸＸ ＸＸＸ□□Ｂ	C position 8 byte command ＸＸＸＸＸＸ: HEX position data □□:　command 10: CSPD REL.IDX 11: CSPD ABS.IDX 12: REL.IDX　13: ABS.IDX　auto backlash correction with "B"
	Ｓ３Ａ□ ±DDDDDDD or Ｓ３Ａ□ ±DDDDDDDB	C position DEC index command □:　A:　absolute index scan, R:　relative index scan ±DDDDDDD: DEC position data auto backlash correction with "B"
	ＳＢＸＸＸ ＸＸＸ□□ OR ＳＢＸＸＸ ＸＸＸ□□Ｂ	D position 8 byte command ＸＸＸＸＸＸ: HEX position data □□:　command 10: CSPD REL.IDX 11: CSPD ABS.IDX 12: REL.IDX　13: ABS.IDX　auto backlash correction with "B"
	Ｓ３Ｂ□ ±DDDDDDD or Ｓ３Ｂ□ ±DDDDDDDB	D position DEC index command □:　A:　absolute index scan, R:　relative index scan ±DDDDDDD: DEC position data auto backlash correction with "B"
R/L	ＳＡＸＹ	data read command　X:　channel No.(0-F) Y:　data No.(0-F) reply: R□□□□□□　(HEX)　3 byte data from read data address
	ＳＡＸＰＳ	position data read　X:　channel No.(0-F) PS:　position data read reply: ±ＤＤＤＤＤＤＤ (DEC)
	ＳＡＸＦＬ	forward DGLS read　X:　channel No.(0-F) FL:　forward DGLS read reply: ±ＤＤＤＤＤＤＤ (DEC)
	ＳＡＸＢＬ	backward DGLS read　X:　channel No.(0-F) BL: backward DGLS read reply: ±ＤＤＤＤＤＤＤ (DEC)
R	Ｓ５ＸＹ□□	data write command X: channel No.　Y: data No.　□□: write data (HEX)
	Ｓ５ＸＰＳ ±DDDDDDD	position data write X: channel No.(0-F)　PS: position data write ±DDDDDDD : write data (DEC)
	Ｓ５ＸＦＬ ±DDDDDDD	forward DGLS write　X: channel No.(0-F)　FL: forward DGLS read ±DDDDDDD: write data (DEC)
	Ｓ５ＸＢＬ ±DDDDDDD	backward DGLS write X: channel No.(0-F)　BL: backward DGLS read ±DDDDDDD: write data (DEC)
R/L	Ｓ６	status & LS read (a row of data is B,A,D,C for "-02N" compatible) reply:R□□□□　□:HEX CODE REM/LOC, LIMIT SW
	BXhhhh	backlash correction data(for CH X) set　(h:HEX,D8F1～270F)
	ＢＸＨ？	backlash correction data(for CH X) read　reply: Ｒｈｈｈｈ(HEX)
	BX±DDDD	backlash correction data(for CH X) set　0～±9999 (decimal)
	ＢＸ？	backlash correction data(for CH X) read　reply: ±ＤＤＤＤ(DEC)
R	FHPA	Find Home Position of channel A
	FHPB	Find Home Position of channel B
	FHPC	Find Home Position of channel C
	FHPD	Find Home Position of channel D

ﾓｰﾄﾞ	コマンド	応 答 内 容
R	RTHPA	Return Home Position of channel A
	RTHPB	Return Home Position of channel B
	RTHPC	Return Home Position of channel C
	RTHPD	Return Home Position of channel D
	DPX	change start direction of channel X to positive
	DNX	change start direction of channel X to negative
	GFXDDDD	write offset data X: channel D: decimal
	SPHXDDDDD	write HSPD X: channel DDDDD: PPS unit speed data
	SPMXDDDDD	write MSPD X: channel DDDDD: PPS unit speed data
	SPLXDDDDD	write LSPD X: channel DDDDD: PPS unit speed data
	SPCXDDDDD	change speed while scanning X: channel DDDDD: PPS unit speed data
R/L	G?X	read home position status X:0 - F(channel) reply RHH :H ASCII hex
	GF?X	read offset data X: channel reply RDDDD :d ASCII dec.
	HP?X	read home position X: channel reply ±DDDDDDD ASCII 7 dec.
	SPH?X	read HSPD of channel X reply RDDDDD D: ASCII 5 dec.
	SPM?X	read MSPD of channel X reply RDDDDD D: ASCII 5 dec.
	SPL?X	read LSPD of channel X reply RDDDDD D: ASCII 5 dec.

CONTENTS

ＰＭ１６Ｃ－０４ＸＤ(Ｌ)
REMOTE MODE USER'S MANUAL

1. Abstract

This manual shows the remote operation via RS232C,GP-IB and LAN(Ethernet TCP/IP). About the local operatin, please see the other manual called "PM16C-04XD(L) LOCAL MODE USER'S MANUAL".

In addition to manual operation by front panel and hand box controller, you can operate PM16C-04XD(L) via communication line by your PC.

Existing commands for PM16C-02Z series, PM16C-04 and PM16C-04S are available to this one. New commands for this one are available to select the access motor number directly (0～9, A,B,C,D,E,F) without considering the exchange of control channel number.

2. Preparation for command communication

Control commands are acceptable when REMOTE/LOCAL switch is in REMOTE side. But inquiry commands are acceptable at any time. When REMOTE/LOCAL mode is in LOCAL side, press REMOTE/LOCAL button or give the command "REM" via communication line before using in "REMOTE" mode.

Remote mode operation can be used in three ways.

(1) LAN
(2) GP-IB
(3) RS232C

These are details regarding to each REMOTE control method.

1) Setting for ＬＡＮ(Ethernet TCP/IP) communication

Easy setting using front panel switches in LOCAL mode(V 1.09 ～)

- Power on
- Goto LOCAL mode by REM/LOC switch.
- Goto SETUP mode by SETUP switch.
- Goto P9 by CW switch in SETUP mode(PM16C-04XD).
  (In case of PM16C-04XDL, go to P10 in SETUP mode by CW lever type switch)
- Move cursor to the data that is to be changed.
- By using ten-key the data can be changed.
- Default IP address data is [192.168.1.55], port number is [7777].
- You can change these data according to your LAN.
- If you need to change port number, 10001 to 10999 are recommended.
- After setting you must power off the unit to enable the new setting.
- To confirm the new setting, you may try if command ("VER?" for example) is received and reply is sent out by the unit, using client PC after connecting by telnet to the unit.
- About another details, please see next "Existing way of setting".

Existing connection method

A. Preparation

- To build up network system safe, you should use a network environment with no relation to outside,
  Prepare PC which connects to this network and basic software (telnet, ping).
- These are the explanations of setup procedure using 10BaseT Cross cable, PC with Windows and optional software "telnet" and "ping" in Windows.

B. Connect to network

・Power on the unit by power switch.
・Set the IP address, subnet mask to PC.
(Example: IP address is 192.168.1.10, sub-net-mask is 255.255.255.0)
・Factory installed IP address of PM16C-04XD(L) is 192.168.1.55, no gateway, subnetmask is 255.255.255.0 and Port NO is 7777.
・Connect controller and PC with 10BaseT Cross cable.
(Otherwise using HUB module, it's available to use straight cable.)
It's also available 100BaseT cable.

<Footnote>

・Next explanation is in case of factory installed settings.
(IP address is 192.168.1.55, and Port No. is 7777.)
When you use another IP address, put in that IP address number.
・Once you lose IP address number, you can't set the connection.
So don't forget the IP address when you change it.
・If you lose IP address, see the note item F.

To ensure right connection test below by ping command in MS-DOS prompt.

```
C:¥Windows>ping 192.168.1.55
        Pinging 192.168.1.55 with 32 bytes of data:
        Reply from 192.168.1.55: bytes=32 time=2ms TTL=255
        Reply from 192.168.1.55: bytes=32 time=1ms TTL=255
        Reply from 192.168.1.55: bytes=32 time=1ms TTL=255
        Reply from 192.168.1.55: bytes=32 time=1ms TTL=255

C:¥Windows>
```

If replies are listed above, physical connection is correct.
If physical connection is not correct, communication replies are below.

```
C:¥Windows>ping 192.168.1.55

        Pinging 192.168.1.55 with 32 bytes of data:

        Request timed out.
        Request timed out.
        Request timed out.
        Request timed out.

C:¥Windows>
```

In this case please retry the connection again after confirming the cable connection.

C. Connection change to network

Once you check the connection is correct, you can enter new IP address and new telnet port No of the unit.
(If default No is OK, you don't have to do this operation.)
The IP address is set to 192.168.1.55, and default port No is 7777 as factory default.
IP address must be changed according to your network system.
If there is no need to change port No, you may use No 7777.
If you need to change port No, the recommended port is 10000 to 10999.

In Windows screen display

START -> Specify the file name and run, file name is

telnet 192.168.1.55 9999

No 9999 is port set number of the unit.

Click OK button and screen changed to telnet mode immediately.

```
        MAC address 00204A80F1B6                <- Depend on the type of unit.
        Software version 01.5 (031003) XPTE     <- Depend on the type of unit.

        Press Enter to go into Setup Mode
```

Press return button within 5 sec.
If the button is not pressed in 5 sec, the connection is automatically cut off.
Then try again from the beginning.

Next display

```
          ......

        Change Setup:
         0 Server configuration
         1 Channel 1 configuration
         3 E-mail settings
         5 Expert settings
         6 Security
         7 Factory defaults
         8 Exit without save
         9 Save and exit           Your choice ?
```

Then select 0.
Set the data as below

```
        IP Address: (192) 192.(168) 168.(001) 1.(55) 50
        Set Gateway IP Address (N) N
        Net-mask: Number of Bits for Host Part (0=default) (0)
        Change telnet configuration password (N) N
```

Write in the new IP address. (In this case new IP address is 192.168.1.50)
If you need to set Gateway IP Address, write in the address number.
Net-mask is like this. In case of 255.0.0.0, number is 24,
in case of 255.255.0.0 number is 16, in case of 255.255.255.0 number is 8.
When you see double displayed character on telnet command screen,
try to check out "Local echo" by click "terminal" -> "Basic setting".

Again

```
        ......
        Change Setup:
         0 Server configuration
         1 Channel 1 configuration
         3 E-mail settings
         5 Expert settings
         6 Security
         7 Factory defaults
```

```
 8 Exit without save
 9 Save and exit           Your choice ?
```

Then select 1.

```
Baud rate(38400)?  ····· push return.
I/F Mode(4C)?      ····· push return.
Flow(00)?          ····· push return.
Port No(7777)?     ····· enter port address of telnet,then push return
  (Default port NO is 7777, if you need to change this number,
                          recommended port number is 10000 to 10999.)
ConnectMode(C0)?   ····· push return.
Remote IP Address:(000).(000).(000).(000)····· push return three times.
Remote Port (0)?   ····· push return.
DisConnMode(00)?   ····· push return.
FlushuMode (80)?   ····· push return.
Pack Control(10)?  ····· push return.
DisConnTime(00:00)?····· push return
  (set data is **:++ means **minutes and ++seconds)
  (default data 00:00 means 5999s = 99min 59sec )
SendChar 1 (0D)    ····· push return.
SendChar 2 (0A)    ····· push return.
Select 9, then finished setting works in the screen below.
```

```
Change Setup:
 0 Server configuration
 1 Channel 1 configuration
 3 E-mail settings
 5 Expert settings
 6 Security
 7 Factory defaults
 8 Exit without save
 9 Save and exit           Your choice ?
```

In these setting items, only IP address must be set.
Other items may not be changed.
If you enter wrong number by mistake, you'd better to restore above data.

D. Get back the setting data of PC

If you change setting data of PC, turn back PC data to initial condition.

E. Connection test

Let's try connecting test by optional Windows software such as "telnet".
Example test data is "telnet 192.168.1.55 7777" in MS-DOS prompt screen.
Or open the command "START" >> "Select the filename and Run",
Then write in the command

"telnet 192.168.1.50 7777".
(IP address number must be one that is changed.)
When in telnet operation, send data "VER?" which are expected reply data.
If reply data is like "1.00 05-07-07", then communication line is right.

F. The way of setting when IP address of controller is unknown

When IP address is unknown, it's impossible to connect the unit by the way of manual 2-1-Existing connection method(p1).
In this case, the setting can be done by the following way using

MAC Address (Hardware Address).
Hardware Address is printed under the LAN module.
(Ver 1.09～ MAC address and IP address are displayed on LCD screen.
See setup mode p10 on the LCD , so you don't need these process)

Example: Assume that MAC Address is [00-20-4a-80-e4-c6].
And target setting IP address will be 192.168.1.50.

Start Windows and set DOS prompt. (Note 1)
Key in the command "arp (address resolution protocol) command".

```
C:¥Windows>arp -s 192.168.1.50 00-20-4a-80-e4-c6
```

Next key in

```
C:¥Windows>telnet 192.168.1.50 1
```

Then connection error will appear on the screen.
Close the telnet screen, again key in next command.

```
C:¥Windows>telnet 192.168.1.50 9999
```

Run this command and soon telnet screen appears.

```
MAC address 00204A80F1B6            <- depend on the type of unit
Software version 01.5 (031003) XRTE <- depend on the type of unit

Press Enter to go into Setup Mode
```

Above content appears, then put on "RETURN" key within 5s.
Otherwise the connection will be cut off automatically. In this case try again.
Next operation is as same as the previous explanation of telnet command.
At this stage IP address 192.168.1.50 is a temporary address.
IP address must be set to a new address number.

(Note 1)
In case of "Windows 95", next procedures are necessary.
This procedure will be done by using existing network or by
confirming a local network.
In case of "Windows 95", more than one ENTRY must to be set on ARP table.
To check it, launch this command.

```
C:¥Windows>arp -a
```

If reply is

```
No ARP Entries Found
```

In this case, launch ping command to existing IP Address in the network.

```
C:¥Windows>ping ***.***.***.***
```

By this command you can add the one Entry number, then you can go on
next process.
If there is one or more Entry number, you can go on next process.

2) Setting for GP-IB communication
The only way of setting GP-IB is put in GP-IB address from front panel.
The delimiter for the data is fixed to CR + LF + (EOI).
PM16C-04DX can receive data whether (EOI) exists or not.
When sending data, (EOI) is always added to data end.

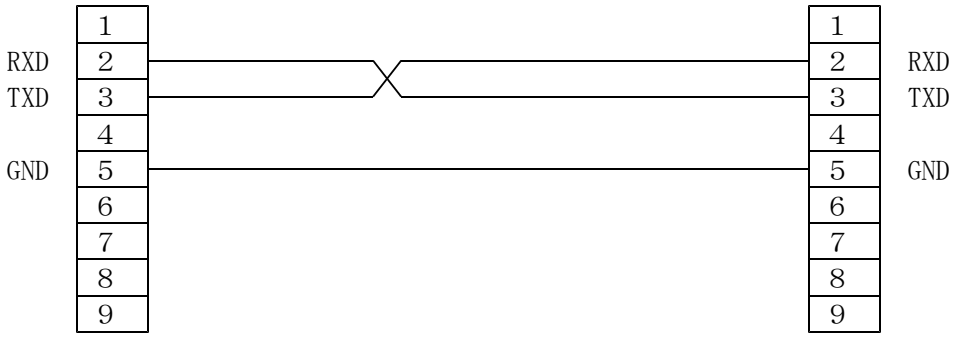
The procedure of GP-IB address setting from front panel is as follows.
Put on power switch of the unit. Set into "LOC" mode by "REN/LOC" button.
Then set into setup mode by "SETUP" button.

In case of PM16C-04XD, open the setup screen P7 of LCD by "CW" button.
When over the page you can set back page by "CCW" button.
In case of PM16C-04XDL, open the setup screen P9 of LCD by "CW/CCW" lever switch.
Set the cursor of LCD display to GP-IB address. Set into the numeric by ten-key.
GP-IB address must be 2 to 31. When the setting number is incorrect,
you'll see the number is blinking.
After changing the address, push the "SETUP" button, then the mode has changed
and setting will be finished.

There is no need to power on again. You can check the communication is OK or NOT by the command "VER?" for example.

3) Setting for RS232C communication
The pin assignment of connector is as follows.

PM16C-04XD(L) side PC side
Pin No Connector of panel side: DE9P
Connector of cable side: DE9S



The way of setting RS232C is only put in BAUD RATE data from front panel.
Another parameters of RS232C communication is fixed as follows.

DATA BIT: 8 STOP BIT: 1 NO FLOW CONTROL NO PARITY

The delimiter for the data is CR + LF.
The procedure of setting BAUD RATE from front panel is as follows.

Put on power switch of the unit. Set into "LOC" mode by "REN/LOC" button.
Then set into setup mode by "SETUP" button.
In case of PM16C-04XD, open the setup screen P6 of LCD by "CW" button.
When over the page you can set back page by "CCW" button.
In case of PM16C-04XDL, open the setup screen P9 of LCD by "CW/CCW" lever switch.
Set the cursor of LCD display to BAUD RATE. Press the CHG button.
BAUD RATE value is changing 1200, 2400, 4800, 9600, 19200, 38400 in rotation.
After changing BAUD RATE, push the "SETUP" button, then the mode will be changed
and setting will be finished.

There is no need to power on again. You can check the communication is OK or NOT by the command "VER?" for example.

3. The detail of communication commands

The format of command is ASCII data, and the delimiter is CR + LF (0DH + 0AH).
After receiving CR + LF, command interpretation begins.
When the unit receives the command without delimiter, the receiving data will be considered to be a front part command characters. In this case, followed commands will be lost, and command interpretation will be impossible.
When sending commands, "CR + LF" must be added at the end of the command, though the "CR + LF" are omitted in the command explained below.

1) REMOTE/LOCAL command

These commands are acceptable in Remote and Local mode.
These commands are acceptable when all channel motors are stopped.

LOC	Set into the Local mode
REM	Set into the Remote mode

2) SRQ command (SRQ signal is one of GP-IB signal lines.)

These commands are acceptable in REMOTE and LOCAL mode.

SRQx1	Set SRQ flag to channel x : x means motor channel 0 ～ F. When channel x motor stopped at this state, SRQ line of this unit goes "H" to inform the state to PC and the SRQ status flag of this unit is set to "1". Once SRQ status flag read out from PC, SRQ status flag is cleared automatically and the SRQ line goes "L". SRQ flag is cleared automatically just after SRQ line of this unit goes "H". If you use SRQ signal when motor stopped, you may set this flag every time.
SRQx0	Clear the SRQ flag of channel x.
SRQ?x	Read out the status of SRQ flag of channel x. The reply is "1" or "0".

3) Status read out commands

These commands are acceptable in REMOTE and LOCAL mode.

STQ?	Read out the Local/Remote mode and the number of stopped motors. The reply is when in REMOTE MODE: Rn when in LOCAL MODE: Ln The maximum number of driving motor simultaneously is 4. When the numbers of stopped motors is 0, there is no left motor to activate. In this case, access command is ignored. Before activating motors, you can check whether activate motor is left or not by this command if you need.
STS?	Read out the Local/Remote mode and the details of each motor state. The format of reply data is like this. R(L)abcd/PNNS/VVVV/HHJJKKLL/±uu·····/±vv·····/±ww·····/±xx·····/ R or L: R: Remote mode L: Local mode a,b,c,d: The selected motor channel number for each display channel 0 ～ F in hexadecimal number. PNNS: The state of motor action for each channel. P: Driving to CW direction N: Driving to CCW direction S: stopped VVVV: The states of limit switch and motor hold off function

for each channel in hexadecimal.
Each data bit is
b3: Motor hold off status
b2: The limit switch status of home position
b1: The limit switch status of CCW direction
b0: The limit switch status of CW direction

HHJJKKLL This value shows the status of motor driving for each channel in 2 digit hexadecimal data.
b7: ESEND received emergency stop command
b6: SSEND received deceleration stop command
b5: LSEND stopped by limit switch
b4: COMERR occurs error
b3: ACCN decelerating
b2: ACCPD accelerating
b1: DRIVE stepping
b0: BUSY data processing or stepping(= busy)

uu･･･,vv･･･,ww･･･,xx･ ･ ･
These are the latest pulse position data for each channel.
If the number is less than ±7 digit number,
the reply data ± 7 digit number.
In case of more than ± 7 digit number, the digit will be expanded according to the number.

4) Motor control commands

① JOG Command
This command is acceptable only for REMOTE mode.

JOGPx Moves one pulse of motor channel x to CW direction.
JOGNx Moves one pulse of motor channel x to CCW direction.

② Seed Select Command
These commands are acceptable only for REMOTE mode.

SPDHx Motor speed selection of channel x is "H"
SPDMx Motor speed selection of channel x is "M"
SPDLx Motor speed selection of channel x is "L"

Next command is acceptable for REMOTE and LOCAL mode.
SPD?x: Read out the set speed of channel x
The replay is HSPD, MSPD or LSPD.

③ SCAN Command
These commands are acceptable only for REMOTE mode.

SCANPx Continuous movement of motor channel x to CW direction.

SCANNx Continuous movement of motor channel x to CCW direction.

The speed of this movement is determined by speed select command ②.

④ SCAN command set with absolute position data (including backlash remove scan)
These commands are acceptable only for REMOTE mode.

ABSx±ddddddddd
The motor of channel x goes to the set position absolutely.

The range of dddd‥‥‥ is -2,147,483,647 ～ +2,147,483,647.
(Digit number is arbitrarily specified.)

ABSxB±ddddddddddd

The motor of channel x goes to the set position absolutely.
The range of dddd‥‥‥ is -2,147,483,674 ～ +2,147,483,647.
(Digit number is arbitrarily specified)
First the motor goes to a specified backlash compensation position, then goes to a target position at slow speed.
(Backlash compensation at every moving)
If the specified backlash compensation position is over the range command will be ignored. At this occasion by using the status read command "ERR?", you'll get "BAD ABS COMMAND" as a reply.

ABSxS±ddddddddd

The motor of channel x goes to the set position absolutely.
The range of dddd‥‥‥ is -2,147,483,647 ～ +2,147,483,647.
(Digit number is arbitrarily specified)
When the direction of backlash compensation and the direction to target position are same, motor goes to target position directly. Otherwise once motor goes to specified backlash compensation position, then goes to a target position at slow speed.
(Backlash compensation if needed)
If the specified backlash compensation position is over the range command will be ignored. At this occasion by using the status read command "ERR?", you'll get "BAD ABS COMMAND" as a reply.

⑤ SCAN command set by relative position data (including backlash data)
These commands are acceptable only for REMOTE mode.

RELx±ddddddddddd

The motor of channel x moves at specified relative data.
The range of dddd‥‥‥ is -2,147,483,647 ～ +2,147,483,647.
(Digit number is arbitrarily specified.)

RELxB±ddddddddddd

The motor of channel x moves at specified relative data.
The range of dddd‥‥‥ is -2,147,483,647 ～ +2,147,483,647.
(Digit number is arbitrarily specified.)
First motor goes to a specified backlash compensation position then goes to a target position at slow speed.
(Backlash compensation at every moving)

RELxS±ddddddddddd

The motor of channel x moves at specified relative data.
The range of dddd‥‥‥ is -2,147,483,647 ～ +2,147,483,647.
(Digit number is arbitrarily specified.)
When the direction of backlash compensation and the direction to target position are same, motor goes to target position directly. Otherwise once motor goes to specified backlash compensation position, then goes to a target position at slow speed.
(Backlash compensation if needed)

⑥ Speed change command while driving

This command is acceptable only for REMOTE mode.

SPCxddd･･･ The motor speed of channel x can be changed while moving.
The unit of speed is PPS.
The range of dddd･････ is 1 ～ 5,000,000.

⑦ SLOW STOP,FAST STOP command
These commands are acceptable both in REMOTE and LOCAL mode.

SSTPx Stop the driving motor channel x with deceleration.

ESTPx Stop the driving motor channel x without deceleration.

ASSTP Stop all the driving motors with deceleration.

AESTP Stop all the driving motors without deceleration.

Another commands concerning motor moving
⑧ PAUSE ON/OFF command
These commands are acceptable only for REMOTE mode.

PAUSE ON (S3016) PAUSE ON command. This command means the motion hold.
Once received this command, further commands are in suspended.
Those commands are in waiting state.
This suspended mode is released by the command "PASE OFF".
This command is useful when you activate some motors simultaneously.
This command doesn't affect any motor that is already moving.

PAUSE OFF (S3017) PAUSE OFF command. This command release the suspended mode.
Motors that are in suspended mode by command "PASE ON" are released.

Those motors start simultaneously after this command.

PAUSE? Read out pause status
reply: ON or OFF

⑨ Constant speed SCAN command
These commands are acceptable only for REMOTE mode.

CSCANPx Activate the motor channel x to CW direction at constant speed.

CSCANNx Activate the motor channel x to CCW direction at constant speed.

⑩ Detect home position drive command
These commands are acceptable only for REMOTE mode.

These commands are related to Local Mode Operation.
See the instruction manual "Local Mode Operation".
4.4 Setting of home position, 5.5 Setting of home position original point(PM16C-04XD)
4.6 Setting of home position, 5.3 Setting of home position original point(PM16C-04XDL)

FDHPx Auto home position search sequence for channel x starts.
First start home position sensor search moving to one direction
that is set in advance by "SETHPx" etc., as a start direction(A).

If the sensor find the home position along this direction(A) and go through the sensor, motor stops slowly.
Then back to opposite side slowly and find the home position and stops. (finished)
Otherwise motor begins to start to direction(A), then find limit switch along this direction, motor stops slowly and move to opposite direction(B).
In this case motor find the home position rising edge then stops.
Next motor begins start for direction(A) again.
Then find the home position and go through the sensor and stops slowly.
Then starts for direction(B) slowly, finally find the home position and stops. (finished)
Thus start moving direction(A) and detecting home position direction (B) is always opposite for each other by this command.
The home position value is memorized as home position data and set the status flag that means home position was memorized.
And the direction for detecting is also memorized because the other way to detect home position may alter detecting direction.
These information can be read out by "SHP?x" and "SETHP?x".

(NOTES)
If there is no home position in moving by this command,
motor will go and return between CW LS and CCW LS.
(Including digital limit switch)
In this case, "STOP" command and "STOP" button is available.
If digital limit switch position is set near the limited range (near ±2,147,483,647), during the deceleration moving the sign of position will be changed.
The home position detect process won't be finished correctly.

GTHPx — This command is useful when repeat the home position detect process again. If the home position is already saved to the unit, motor can move to certain area and goes to the home position slowly.
The home position detect direction is as same as the memorized one.

SCANHPx — To detect the home position of motor channel x along CW direction.
When detect the home position, motor stops suddenly.
So you need to move slowly to avoid step-out of motor.
When there is no home position, motor will be stops at CW or CCW limit switch. If you know the home position roughly, you can check the home position in a short time. After detecting home position by this command, using "GTHPx" command, you can detect the home position in a short time totally.

SCANHNx — This command is as same as "SCANHPx" without the direction CW.
The starting direction is CCW.

5) Commands for set and read out parameters

① Commands for set and read out motor parameters
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

SETMTxABCD — Set the fundamental characteristics of motor channel x
A: 1/drive enable, 0/drive disable
If you set the motor disable, you won't activated it and you can

avoid unexpected moving by the operation error.
Unless you set enable, you can't move the motor.

B: 1/hold on, 0/hold off
When you set the motor hold off, this unit outputs the hold off signal to external devices. Before you send motor active commands, you have to set "hold on". After motor stopping you have to set "hold off" again if you need to set the motor hold off state. *1)
In LOCAL mode these "hold on" action are done automatically.

C: 0/constant, 1/trapezoidal, 2/ S character
The acceleration and deceleration mode of moving motor is selectable.
That is constant form, trapezoidal form or S character form.

D: 0/Pulse-Pulse, 1/Pulse-Direction 2/Pulse-Direction-Reverse *2)
Output signal to motor driver that is set outside of this unit is selectable.
They are P-P way, P-D way or PDR way. *2)

*1) V1.15～ Automatic hold on/off moving in REMOTE mode supported.
*2) V1.30～ PDR can be chosen for hard ware type "HD-VERn" n>4 replied by the command "VERH?".

SETMT?x — This command is readout command above motor characteristics.
The reply data is in order ABCD. The default data is "1010".

STOPMDxAB — This command is set to stop motor channel x, slowly or fast.

A: 0/PB slow stop, 1/PB fast stop
It means slow stop or fast stop by STOP switch on front panel.

B: 0/LS slow stop, 1/LS fast stop
It means slow stop or fast stop by limit switch.

STOPMD?x — This command is readout command above motor stop way.
The reply data is in order AB. The default data is "00".

② Commands for set and read out speed parameters
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

SPDHxdddd···· — The high speed of motor channel x is dddd····. Unit is PPS.

SPDH?x — This command is readout command above SPDHx.
The reply is dddd····. Unit is PPS.

SPDMxdddd···· — The middle speed of motor channel x is dddd····. Unit is PPS.

SPDM?x — This command is readout command above SPDMx.
The reply is dddd····. Unit is PPS.

SPDLxdddd···· — The low speed of motor channel x is dddd····. Unit is PPS.

SPDL?x — This command is readout command above SPDLx.
The reply is dddd····. Unit is PPS.

SPDAL? — This command is readout preset speed values for 4 channel motors.
The reply is like these. Abcd/Hdddddddd/Mdddddddd/Ldddddddd/Hdddddddd
a,b,c,d: 0～F means motor channel

ddddddd: preset speed value. (1～5,000,000) Unit is PPS.
While at least one motor is moving, the reply of it is "0000000".

③ Commands for set and read out acceralaton and deceleration parameters
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

RTExddd — The acceleration and deceleration of motor channel x is set by this command.
ddd: 0～115 This is a code number. See "RATE DATA TABLE"

RTE?x — This command is readout t he acceleration and deceleration value of motor channel x.
The reply is ddd.

RATE DATA TABLE(unit: ms/1000pps)

No.	RATE	No.	RATE	No.	RATE	No.	RATE	No.	RATE	No.	RATE
0	1000	20	150	40	22	60	3.3	80	0.47	100	0.068
1	910	21	130	41	20	61	3.0	81	0.43	101	0.062
2	820	22	120	42	18	62	2.7	82	0.39	102	0.056
3	750	23	110	43	16	63	2.4	83	0.36	103	0.051
4	680	24	100	44	15	64	2.2	84	0.33	104	0.047
5	620	25	91	45	13	65	2.0	85	0.30	105	0.043
6	560	26	82	46	12	66	1.8	86	0.27	106	0.039
7	510	27	75	47	11	67	1.6	87	0.24	107	0.036
8	470	28	68	48	10	68	1.5	88	0.22	108	0.033
9	430	29	62	49	9.1	69	1.3	89	0.20	109	0.030
10	390	30	56	50	8.2	70	1.2	90	0.18	110	0.027
11	360	31	51	51	7.5	71	1.1	91	0.16	111	0.024
12	330	32	47	52	6.8	72	1.0	92	0.15	112	0.022
13	300	33	43	53	6.2	73	0.91	93	0.13	113	0.020
14	270	34	39	54	5.6	74	0.82	94	0.12	114	0.018
15	240	35	36	55	5.1	75	0.75	95	0.11	115	0.016
16	220	36	33	56	4.7	76	0.68	96	0.10		
17	200	37	30	57	4.3	77	0.62	97	0.091		
18	180	38	27	58	3.9	78	0.56	98	0.082		
19	160	39	24	59	3.6	79	0.51	99	0.075		

④ Commands for set and read out latest pulse position parameters
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

PSx±dddddd — Set the current position data of motor channel x.
The range of dddd····· is -2,147,483,674 ～ +2,147,483,647.
(the number of digit is arbitrary.)

PS?x — Read out the current data of motor channel x.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

⑤ Commands for set and read out digital limit position parameters
The setting commands are acceptable only for REMOTE mode.

The read out commands are acceptable for REMOTE and LOCAL mode.

FLx±ddddddd　Set the digital limit data to CW side of motor channel x.
When you set the digital limit switch available, the motor doesn't move over the preset position.
(When limit switch stop mode is deceleration stop mode, motor overrun at some range.)
If you set digital limit switch available and present position is out of moving area, motor could move to the moving area direction.

FL?x　Read out the digital limit data to CW side of motor channel x.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

BLx±ddddddd　Set the digital limit data to CCW side of motor channel x.
When you set the digital limit switch available,
the motor doesn't move over the preset position.
(When limit switch stop mode is deceleration stop mode,
motor overrun at some range.)
If you set digital limit switch available and present position is out of moving area, motor could move to the moving area direction.

FL?x　Read out the digital limit data to CCW side of motor channel x.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

⑥ Commands for set and read out home position status flag parameters
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

SETHPx0XYZ　Set the parameters of home position setting for motor channel x.
X: 0/not found, 1/LS already found
Home position data is already found or not.
Y: 0/CW direction, 1/CCW direction
The direction when detecting the home position.
Z: 0/CW direction, 1/CCW direction
The start moving direction of motor channel x when detecting the home position in automatic detecting mode.

SETHP?x　Read out the state of home position setting for motor channel x.
The meaning of reply data is above command.
The reply data format is :0XYZ. Example is "0100".

SHPx±ddddddd　Set the home position data of motor channel x.
Normally the home position data is automatically set by HP mode, but this command changes the data by force.

SHP?x　Read out home position data. The reply is ±ddddddd (decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.
When the home position was not found, the reply data is "NO H.P".
(The origin detect flag that is in the reply for the command "SETHP?x" X is 0.)

SHPFxdddd　　Set the home position offset for motor channel x.
When you detect home position by command "GTHPx", home position searching starts from the distance of offset value from current home position. When there is no home position even if motor moves two times of distance of this offset value, then this detection is failure and memorized original point data were lost.
The range of dddd is 0 ～ 9999.
When you set this value over 9999, set data will be 9999.

SHPF?x　　Read out the original point offset position data of motor channel x.
The reply is ±dddd (4 digit decimal number).

⑦ Commands for set and read out data in local mode
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.
These data are useful only for LOCAL MODE.

SABSx±ddddddd　　Set the absolute position data of motor channel x by LOCAL mode.
This value is shown on LCD in ABS scan motion by LOCAL mode .
(shown on the second screen for the type XDL)

SABS?x　　Read out the absolute position data of motor channel x by LOCAL mode.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

SRELx±ddddddd　　Set the relative moving data of motor channel x by LOCAL mode.
This value is shown on LCD in REL scan motion by LOCAL mode .
(shown on the second screen for the type XDL)

SREL?x　　Read out the relative moving data of motor channel x by LOCAL mode.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

SPRSx±ddddddd　　Set the preset position of motor channel x by LOCAL mode.
This value is shown on LCD in SCAN motion by LOCAL mode .
(shown on the second screen for the type XDL)

SPRS?x　　Read out the preset position of motor channel x by LOCAL mode.
The reply is ±ddddddd(decimal number).
When the digit of reply data is over 7 digit, the digit of reply data will increase.

SETJGxdddd　　Set the JOG steps of motor channel x by LOCAL mode.
When you put on JOG switch, motor moves by JOG steps at one time in LOCAL mode.
The range of dddd is 0 ～ 9999.
This value is shown on LCD in SETUO screen by LOCAL mode .

SETJG?x　　Read out the JOG steps of motor channel x by LOCAL mode.
The reply is ±dddd(4 digits decimal number).
When the digit of reply data is over 4 digit, the digit of reply data will increase.

SACTxY Not used.
SACT?x Not used.

6) Command for set and read out limit switch data parameters

The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

SETLSxDYYYOyyy Set the states of limit switch of motor channel x.
D: 0/Digital limit switch disable, 1/Enable
YYY: 0/Limit switch disable, 1/Enable
yyy: 0/Limit switch set is N.O, 1/N.C
YYY,yyy Order is H.P LS, CCW LS, CW LS.

SETLS?x Read out the states of limit switch of motor channel x.
The reply is DYYYOyyy. (Meaning is shown above.)

LS? Read out the motor channel and the states of limit switch for each drive channels.
The reply data is abcdHJKL.
a,b,c.d: It means the motor channel for A,B,C,D drive channel.
It's a hexadecimal number.(One character)
H,J,K,L: It means the state of limit switch for each drive channel.
Also detail meaning of H is

b3(hold off)	b2(HP LS)	b1(CCW LS)	b0(CW LS)
1:hold off	1: LS on	1: LS on	1: LS on
0:hold on	0: LS off	0: LS off	0: LS off

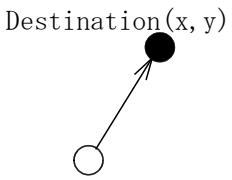
7) Interpolation drive command for two axes

By two axis interpolation drive command, you can move 2 motors as straight line move, circular move and perfect circle move on a X-Y flat plane.
The setting commands are acceptable only for REMOTE mode.
There are 4 motor channels (A,B,C,D) those can be driven independently each other.
Two axis interpolation driving command is applicable to a combination of A and B or C and D.
Interpolation driving command using channel A-B begins "C0····".
Interpolation driving command using channel C-D begins "C1····".
The speed of interpolation move is preset value of channel A and C.

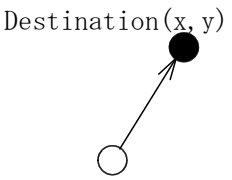
command	details of command	FIG
C0ALNab±xx···/±yy··· C1ALNab±xx···/±yy···	absolute address a,b axis straight line interpolatin to the destination. a,b:0～F xx···,yy···:decimal under 9 digit	A
C0RLNab±xx···/±yy··· C1RLNab±xx···/±yy···	relative address a,b axis straight line interpolation to the destination a,b:0～F xx···,yy···:decimal under 9 digit	B
C0ACPab±xx···/±yy···/±uu···/±vv··· C1ACPab±xx···/±yy···/±uu···/±vv···	absolute address a,b axis cw direction circular interpolation with center position data. a,b:0～F x,y: destination u,v: center position x···,y···,u···,vv··· : decimal under 9 digit perfect circle interpolation will be done by setting the destination to current position.	C

command	details of command	FIG
C0ACNab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1ACNab±xx･･･/±yy･･･/±uu･･･/±vv･･･	absolute address a,b axis ccw direction circular interpolation with center position data. another data are same as above.	D
C0RCPab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCPab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis cw direction circular interpolation with center position data. a,b:0～F x,y: destination u,v: center position x･･･,y･･･,u･･･,vv･･･:decimal under 7 digit perfect circle interpolation will be done by setting the destination to (0,0) position.	E
C0RCNab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCNab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis ccw direction circular interpolation with center position data. another data are same as above.	F
C0AACab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1AACab±xx･･･/±yy･･･/±uu･･･/±vv･･･	absolute address a,b axis circular interpolation with bypass point data.(Destination setting to current position aren't allowed, use "C0ACC" command)a,b:0～F x,y:destination u,v:bypass point x･･･,y･･･,u･･･,vv･･･:decimal under 9 digit	G
C0RACab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RACab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis circular interpolation with bypass point data.(Destination setting to current position aren't allowed, use "C0RCC" command)a,b:0～F x,y:destination u,v:bypass point x･･･,y･･･,u･･･,vv･･･:decimal under 7 digit	H
C0ACCab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1ACCab±xx･･･/±yy･･･/±uu･･･/±vv･･	absolute address a,b axis perfect circle interpolation with two bypass point data. a,b:0～F x,y:bypass point 1 u,v:bypass point 2 x･･･,y･･･,u･･･,vv･･･:decimal under 9 digit	I
C0RCCab±xx･･･/±yy･･･/±uu･･･/±vv･･･ C1RCCab±xx･･･/±yy･･･/±uu･･･/±vv･･･	relative address a,b axis perfect circle interpolation with two bypass point data. a,b:0～F x,y:bypass point 1 u,v:bypass point 2 x･･･,y･･･,u･･･,vv･･･:decimal under 7 digit	J

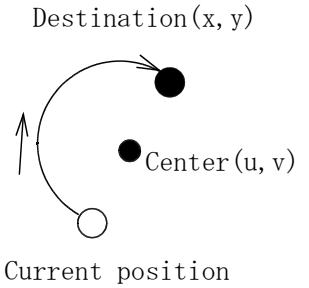
A. Absolute data

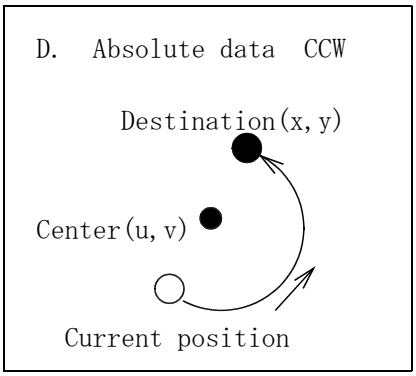


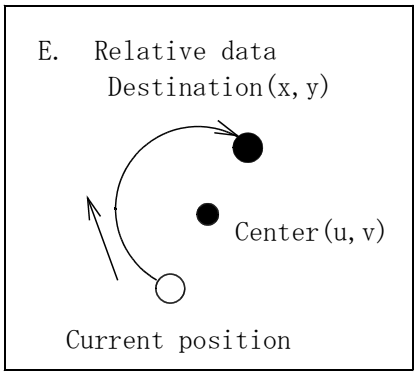
B. Relative data

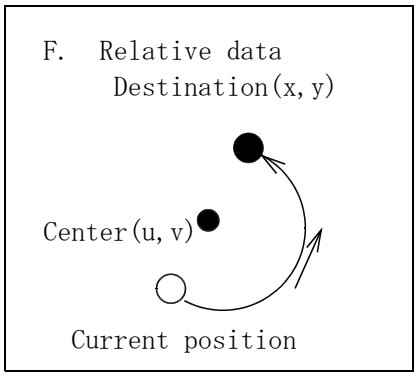


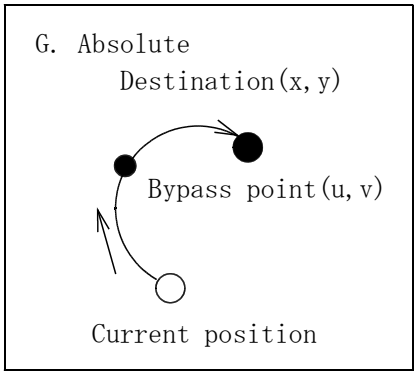
C. Absolute data CW

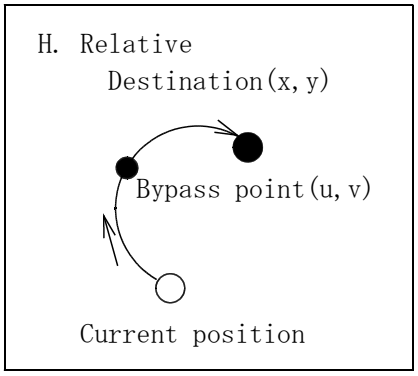


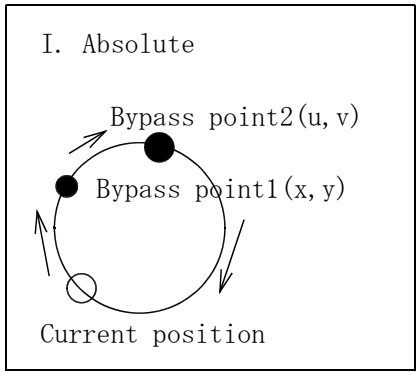


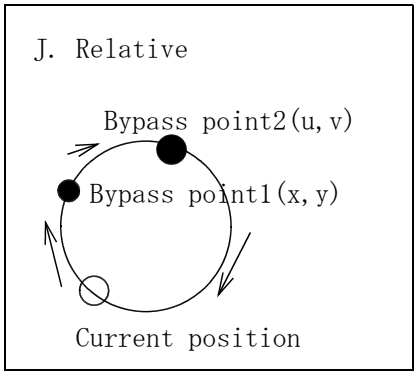












8) Timing pulse out commands

(A) This unit outputs the TTL level signal in these two modes.
One is gate mode, gate signal outputs between start point and stop point.
Those setting must be done in advance.
Another is interval output mode, pulse outputs from pulse start point every interval p reset pulse.
The pulse width of this mode is selectable 200 ns, 10μs, 100μs and 1 ms.
These mode and parameters are configurable for each motor channel.
The setting commands are acceptable only for REMOTE mode.
The read out commands are acceptable for REMOTE and LOCAL mode.

(B) Command Explanations

① TMGMxY Preset the timing mode of motor channel x
Y: 0 Disable output of timing pulse.
Y: 1 Gate mode. Gate signal outputs between start point and stop point.
Y: 2 Interval mode. Output pulse width is 200 ns.
Y: 3 Interval mode. Output pulse width is 10 μs.
Y: 4 Interval mode. Output pulse width is 100 μs.
Y: 5 Interval mode. Output pulse width is 1 ms.
In interval mode, timing pulse output every interval preset pulse between start and stop pulse area.

② TMGM?x　　Read out the mode of timing pulse o motor channel x.
The Reply data is 0～5, above content.

③ TMGRx　　Timing out mode of motor channel x becomes "ready".
This command is acceptable only for the motor x stopped.
For interval mode (timing out mode is 2～5), this command works correctly only in the position that is before the start pulse position.
Mode "ready" means the preparation of pulse out has finished.
When in ready mode, timing pulse outputs after motor passed the start position.
In case of interval mode, once the motor has passed the start point, "ready" condition is cleared. But the output action continues until the stop position.
When motor stopped in the midstream, even if the ready flag is cleared, timing pulse outputs until the stop position.
But once pulse are output, pulses never output in the same area again.
If you want to stop output pulse signal in midstream, you need to send the command "TMGCx", then "ready" flag is cleared and pulse out is cancelled.
Another case of gate mode (timing out mode is 1), the "ready" flag is not cancelled after motor passed the start point.
Gate signal continues output "H" within the limited area despite of the motor direction.
If you want to stop output signal in midstream, you need to send the command "TMGCx", then "ready" flag is cleared and gate out is cancelled (goes to "L").

④ TMGCx　　The "ready" flag of motor channel x is cleared.
This command is acceptable only for motor stopped period.

⑤ TMGR?x　　Read out the "ready" flag state of motor channel x.
The reply is that when in "ready" mode reply is "YES", otherwise reply is "NO".
You can also check the "ready" flag to see the LCD display of front panel.

For PM16C-04XD

non active(can no control in LOCAL mode)	_CH05_
active(can control in LOCAL mode)	*CH05*
active and timing pulse ready	#CH05#

For PM16C-04XDL

non active(can no control in LOCAL mode)	orange LED lamp on
active(can control in LOCAL mode)	orange LED lamp off
active and timing pulse ready	"#" display on LCD

⑥ TMGSx±ddddddd　　Set the start position of motor x timing out mode

⑦ TMGS?x　　Read out the start position of motor x timing out mode

⑧ TMGSx±ddddddd　　Set the stop position of motor x timing out mode

⑨ TMGS?x　　Read out the stop position of motor x timing out mode

⑩ TMGSx±ddddddd　　Set the interval pulse count of motor x timing out mode

⑪ TMGS?x Read out the interval pulse count of motor x timing out mode

(C) The procedure of setting timing out mode

① Set the activate motor channel to control display channel(A-D, TP0-TP3) by channel set command "SETCHabcd".
The output timing pulse for window A is gotten from TP0 and B, C, D for TP1, 2, 3.
To confirm the setting "SETCH?" is convenient.
These setting can be done by old command below too.

S11x	Motor channel x to display channel A
S12x	Motor channel x to display channel B
S15x	Motor channel x to display channel C
S16x	Motor channel x to display channel D

To check the preset motor channel, "S10","STS?" and "LS?" commands are useful. .

② You need to set these parameters to motor channel x.

To set timing out mode	"TMGMxY"
To set timing out start position	"TMGSx±ddddddd"
To set timing out stop position	"TMGEx±ddddddd"
To set timing out interval pulse count	"TMGIx±ddddddd"

Once you have set these parameters, these data are stored in this unit and never changed until your next data change operation.
In factory shipment default data are installed.

③ Move the timing out motor channel to outside the range of timing start position.
If the motor position is outside the range of timing start position, you don't need to move it.
In case of gate mode (timing out mode is 1), you don't need above operation.
But when the motor position is within start and stop position, output signal goes "High" when this motor channel becomes "ready".

④ Set timing out mode "ready" (Command "TMGRx")
(Preparation of signal out is finished)

⑤ Move the motor position toward to stop position
You can use absolute position move command, relative data move command and continuous move command.
If you set timing out parameters to several channels (2-4), start them simultaneously, you can use this unit as a timing generator that has four kinds of signal output.
(Note)
When in interval out mode (timing out mode is 2,3,4 and 5), if output pulse width >= interval pulse period output signal goes "High" and remain the status instead of pulse shape.

9) Auto change drive function while moving
While trapezoidal drive moving, speed, acceleration/deceleration rate can be changed by the data scheduled in advance. This function can be started by S-character drive command, but the result moving become trapezoidal.
The timing and the contents of the change data can be set to maximum 128 data.
The timing of the change can be set by relative position data from the start point, the time (ms) from change point before or drive pulse speed (pps).
The contents of change data are speed, acceleration/deceleration rate (*1) and stop comm and.

1. Data write command

This command are acceptable only in REMOTE mode.
Scheduled data can be written by this command.
Synchronous start driving by two or more motors, the data must be written for each axes. You don't need to rewrite the data again if the data have no change.

ACSxyyy/PNT/JJJ･･･J/FNC/LLL･･･L

ACS:Auto Change Speed command(fixed)
x: channel(0 - F)
yyy: data number(0 - 127)
PNT:END(no more data)
After the end of data, "ACSxyyy/END/" must be sent.
ADD(relative address from start point)
TIM(relative time from previous point)
ACC(speed data while acceleration)
DEC(speed data while deceleration)
JJJ･･･J:relative address(±2,147,483,647) or time(0-65,535ms) or speed data(1 - 5,000,000pps)
FNC:SPD(speed in pps) means LLL･･･L is speed data
RTE(rate number) means LLL･･･L is rate data
SLW(slow stop) SLOW STOP(LLL･･･L:not used)
FST(fast stop) FAST STOP(LLL･･･L:not used)
NOP(no operation) no operation, skip this data
LLL･･･L:speed data(1 - 5,000,000pps) or RATE(rate data number in the range)

(*1)
Rate can be changed only in the same range where current rate belongs.
The range that can be changed are below.
The group where current rate number belongs is the upper range in the list below. Then, for example, if you need to change rate in group M2 you must set the rate number 31 to 91 in advance.

Rate group	RATE No.
L1 TYPE	0 - 60
L2 TYPE	17 - 76
M1 TYPE	24 - 84
M2 TYPE	31 - 91
H1 TYPE	41 - 100
H2 TYPE	55 - 115

Sample: Speed change at same position of CH0 and CH1 with synchronous start.

```
ACS0000/ADD/5000/SPD/3000       :speed change to 3000pps at position 5000
ACS0001/ADD/10000/SPD/6000      :speed change to 6000pps at position 10000
ACS0002/ADD/20000/SPD/10000     :speed change to 10000pps at position 20000
ACS0003/ADD/30000/SLW           :slow stop at position 300000
ACS0004/END                     :program end(must be written)

ACS1000/ADD/5000/SPD/3000       :speed change to 3000pps at position 5000
ACS1001/ADD/10000/SPD/6000      :speed change to 6000pps at position 10000
ACS1002/ADD/20000/SPD/10000     :speed change to 30000pps at position 20000
ACS1003/ADD/30000/SLW           :slow stop at position 30000
ACS1004/END                     :program end(must be written)
```

Sample: Speed change at same timing of CH2 and CH3 with synchronous start.

```
ACS2000/TIM/0/SPD/1000  (dummy) :speed change to 1000pps at 0 ms
ACS2001/TIM/1000/SPD/3000       :speed change to 6000pps at 1000ms
ACS2002/TIM/1500/SPD/6000       :speed change to 10000pps at 1500ms
ACS2003/TIM/2000/SLW            :slow stop at 2000ms
ACS2004/END                     :program end(must be written)

ACS3000/TIM/0/SPD/1000  (dummy) :speed change to 1000pps at 0 ms
ACS3001/TIM/1000/SPD/3000       :speed change to 6000pps at 1000ms
ACS3002/TIM/1500/SPD/6000       :speed change to 10000pps at 1500ms
ACS3003/TIM/2000/SLW            :slow stop at 2000ms
ACS3004/END                     :program end(must be written)
```

You must prepare dummy data,
If you intend to change first data by time more than one motor synchronously, you must prepare dummy data at the top of the list.

2. Data read command

This command are acceptable both in REMOTE and LOCAL mode.
Can read out the data prepared by "ACSxyyy/PNT/JJJ･･･/FNC/LLL･･･L"

ACS?xyyy
reply:xyyy/PNT/JJJ･･･J/FNC/LLL･･･L

Read out sample(assume data set as previous clause)

Send command	reply	
ACS?0000	0000/ADD/005000/SPD/003000	6 digit at least replied,
ACS?0001	0001/ADD/010000/SPD/006000	
ACS?2000	2000/TIM/000000/SPD/001000	
ACS?2001	2001/TIM/001000/SPD/003000	

3. Ready set command for auto chagne scan

This command are acceptable only in REMOTE mode.
This command must be send to every motors if more than one motor are to start synchronously.
Must be send before auto change scan moving.

ACSPx set ready auto change scan data
Can confirm ready status by the command next clause.
Can't set ready if the "END" is not written at the end of the list.

4. Ready set confirmation for auto change scan

This command are acceptable both in REMOTE and LOCAL mode.
Can know if the status is ready or not.

ACSP?x
reply: ready, not ready

After starting auto change scan, the reply of this command become "not ready".
After sending data write command "ACSxyyy/PNT/JJJ･･･ ", the reply of this command become "not ready".
At "not ready" status, auto change scan drive can't work.

5. Clear ready flag for auto change scan

This command are acceptable only in REMOTE mode.
Clear ready flag for auto change scan.

ACSCx

Only channel x become "not ready" by this command.
By this command you can stop the auto chagne scan drive already prepared before.
At "not ready" status the moving does not become auto change scan drive.

6. "PAUSE ON" or "S3016" command for auto change scan
This command are acceptable only in REMOTE mode.
Use when synchronous start for more than one motor is needed.

PAUSE ON or S3016

7. Auto change scan command
This command are acceptable only in REMOTE mode.
Send this command to every motors when synchronous start for more than one motor is needed.

Four commands below work as auto change scan command when ready for auto change scan are set.

ABSx(B)±ddddddddd	absolute position moving
RELx(B)±ddddddddd	relative position moving
SCANPx	scan to positive direction
SCANNx	scan to negative direction

8. "PAUSE OFF" of "S3017" for synchronous start
This command are acceptable only in REMOTE mode.
Use when synchronous start for more than one motor is needed as a pare with "PAUSE ON" or "S3016" command described in term 6. above.

PAUSE OFF or S3017

The moving motors by auto change scan command always can be stopped by normal stop command for example "SSTPx", "ESTPx","ASSTP" or "AESTP".

9. About timing error when using auto change scan command
The change start time after detection of the change condition when moving in auto change scan drive are below and they are different when moving in constant speed or moving in acceleration or deceleration.

in constant speed : < 320μs
in acceleration : < 160μs + period of acceleration
in deceleration : < 160μs + period of deceleration

Further if the condition of auto change scan are detected simultaneously for A pos, B pos, C pos and D pos then the timing of B, D pos are delayed 80 μs than those of A, B pos. So be careful to use these function synchronously to four motors.

Period data for speed change (extract) unit : ms

RATE No	ms/KHz	L1 type	L2 teyp	M1 type	M2 type	H1 type	H2 type
0	1,000.000	50.000					
7	510.000	25.500					
17	200.000	10.000	50.000				
24	100.000	5.000	25.000	50.000			
31	51.000	2.550	12.750	25.500	51.000		
41	20.000	1.000	5.000	10.000	20.000	50.000	
55	5.100	0.255	1.275	2.550	5.100	12.750	51.000
60	3.300	0.165	0.825	1.650	3.300	8.250	33.000
67	1.600		0.400	0.800	1.600	4.000	16.000
74	0.820		0.205	0.410	0.820	2.050	8.200
76	0.680		0.170	0.340	0.680	1.700	6.800
82	0.390			0.195	0.390	0.975	3.900
84	0.330			0.165	0.330	0.825	3.300
89	0.200				0.200	0.500	2.000
91	0.160				0.160	0.400	1.600
98	0.082					0.205	0.820
100	0.068					0.170	0.680
106	0.039						0.390
113	0.020						0.200
115	0.016						0.160

10) Other commands

VER? Read out version information of inside firmware program.
The reply will be like "1.00 06-10-14 PM16C04X".
The same firmware is installed to PM16C-05XD and PM16C-04XDL.

ACSK?x Read out auto change scan data written inner IC MCC06.
The data indicate the point where change occurs.
reply aabb,hhhh,hhhh
aa:code(00:END,01:ADD,02:TIM,80:ACC,81:DEC)
bb:sequence number(0 to 7F)
hh･･･hh:data

ACSH?x Read out auto change scan data written inner IC MCC06.
The data indicate the contents of change.
reply aabb,hhhh,hhhh
aa:code(00:SPD,01:RTE,02:SLW,03:FST,0F:NOP)
bb:sequence number(0 to 7F)
hh･･･hh:data

ERR? Error status read out ommand.
If there are more than one error, the reply will be the information that is stored to lower bit of error flag.

ERRF? Read out error flag.(can be read in two digits of hexadecimal)
reply HH B0:COMMAND ERROR, B1:MCC06 BUSY ERROR, B2:BAD ABS COMMAND

ERRC All error flag clear

ERRCx Indexed error flag clear
x:0 COMMAND ERROR clear
x:1 MCC06 BUSY ERROR clear
x:2 BAD ABS COMMAND clear

FROM?　　For maintenance command.
There are two flash ROM for program memory inside.
You can check which one is active for flash ROM.
The reply is FROM0 or FROM1.

FROM1,FROM2　　For maintenance command. You can select the active flash ROM.
NOTICE: When you set this command and power on this unit or send command "REST", program starts again by specified ROM and all parameters are initialized.

STEM?　　For maintenance command.
Can be read out status port 1 of inner IC MCC06.
reply　aaaa/bbbb/cccc/dddd
The status of control IC A,B,C,D are read out in hexadecimal style.

VERH?　　For maintenance command. Read out the hardware version of this unit.
The reply is like this "HD-VER0", "HD-VER1" ･･･ and "HD-VER6".
It means the hardware version of PM16C-04XD and PM16C-04XDL.

REST　　For maintenance command. You can restart the program without power switch operation.

11) Added command and function
(V1.14～)

SETCHabcd　　Set channel(0～9,A,B,C,D,E,F) to the control window A,B,C,D position.
By using "-" like "SETCH01--", the "-" channel won't be changed.
This command is acceptable only in REMOTE mode.
If the channel is busy while moving etc., the command is ignored.

SETCH?　　Read out current setting channel.
reply : "34AB" in order A,B,C,D position.

(V1.14～)
Motor stop function by speed change button on hand box(PM16C-HDX, -HDX2)
This function can be used only in REMOTE mode.
Press the speed change button on the hand box while REMOTE mode more than 3 second, H, M, L LED on it all lighten and the speed change button become stop button.
At this status, moving motor by the remote command can be stopped by this button.
Also by 3 seconds pressing this button, this button return back to normal speed change button.

4. The firm-ware version-up
1) Upgrade the firmware
You can perform firmware upgrade of PM16C-04XD(L) via communication line.
To keep safety you had better cut off the connection from unit to motor driver, or put off the power line of motor drivers.
It's convenient to use RS232C or LAN connection.
These are the procedures of upgrade via LAN communication using "Tera Term" free software.

① Download the text-file for version upgrade from TSUJI-ELECTRIC HP, and unzip it to your PC.
② Launch the program "TeraTerm".
Select TCP/IP and enter IP address and port No of PM16C-04XD(L).
Operation is SETUP -> Terminal then setting of New-Line is to be CR+LF in Receive

and Transmit set.
Mark on Local echo and "OK". Send the command VER?, and reply is like "1.00 06-10-14 PM16C04X" then the connection will be good.

③ Set PM16C-04XD(L) to REMOTE MODE by local operation or remote operation.
To change in remote operation send the command "REM".

④ Operation is File -> Send file then click the file name.
Specify the file name and "OPEN".
It begins the download procedure.

⑤ You can see the process of transferring the file data to PM16C-04XD(L) on your PC.
The "REMOTE" lamp on the PM16C-04XD(L) is blinking on and off slowly that indicate receiving the file by PM16C-04XD(L).

⑥ For about 90 seconds download procedures continues, then "REMOTE" lamp turns on quick blinking mode. Then the data write procedure begins to start for about 20 seconds. After finishing data write procedure to flash ROM, "REMOTE" lamp turns off then "LOCAL" lamp turn on. Program upgrade procedure is finished.

⑦ Set TCP/IP line off, then finish the TeraTerm program.
Put off the power line of PM16C-05XD(L), then put on this unit again.
If you don't want to put off the unit, send command "REST"(V1.09～).
Thus the unit runs again from new version program.

2) If troubles occurred,
If trouble occurred in download process, when put on the unit again, sometimes program runs out of control.
Initial display character isn't correct. In this case once put off the unit and put on it again pushing ten-key "0" switch. (Type XD: ten-key "0", type XDL: ten-key "8")
The unit runs from previous ROM version again. And you can try again upgrade procedure.
(NOTE)
This method is useful at any time, but the display "NEW","OLD" those are shown in LCD display in SETUP mode will not be changed.
Even if by the above operation, program runs out of control you can start again next procedure.
There is a communication program inside CPU-ROM.
When you use this mode you have to pay attention to following procedures.

CAUTION: When you open the cover of this unit, be careful to get shock.

First take out power cable of it.
If you have some troubles to do next procedure please contact us.

1. Put off the power switch of this unit and open the top cover.
Set the dip switch 2 to side "ON". (Dip switch 1 is still side "OFF".)
Dip switch is beside the button battery on print circuit board "TEP036" (XD).
In case of XDL, the print circuit board is "TEP063".
2. Put on the power line pushing ten-key switch "5".
The "RED" led lamp that indicate "REMOTE" is flashing on and off for 15 seconds, then "RED" lamp turn on red continuously.
At this stage LCD display is not correct yet.
3. Put off the power switch of this unit again, then set the dip switch 2 to side "OFF". (Dip switch 1 is still side "OFF".)
4. Put on the power line pushing REL/LOC button.
Program starts by Version 1.00 firmware.
(In this stage if LCD display may not be correct, but don't care of it. It's OK if you can change remote-local mode by REM/LOC button.)

Next procedure is above describes ①～⑦.

In local mode you can change NEW/OLD program by button control.
(In setup mode XD: p8 or XDL: p11) If you try to use by previous version program, this function is useful.
When you change firmware program all preset data are cleared, and setting data will become default state.

5. Manual and Firmware History

2007.09.13(manual rev.1)
"PAUSE ON", "PAUSE OFF" command added(Firmware V1.13～)
Auto change drive function added(V1.13～)
While moving speed change etc. can be done by previous setting.

2008.07.17(manual rev.9)
Altered the order of "A", "B" data in the sentence of "STOPMDxAB" explanation.
Add command "SETCHabcd", "SETCH?", "HDSTLS?" (Firmware V1.14～)
Auto hold on/off function added for REMOTE mode(Firmware V1.15～)

2009.09.16(manual rev.10)
"HOLDxON", "HOLDxOFF", "HOLD?x"/reply:"ON" or "OFF" added(Firmware V1.17～)
V1.20 ～ V1.29 : skipped
Direction logic change available when Direction - Pulse output mode for those that has hardware type "VERH?"/"HD-VERn" n > 4.(V1.30～)
Motor stop while REMOTE mode contorl by speed change button on the hand box.(V1.31～)

For the further information, feel free to ask us.

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6. Specifications

Power	Voltage and Freq	AC 85V ～ 264V 47 - 440Hz 50VA
IN/OUT	Control	16 motors can be controlled
	Capability	4 motors can be controlled synchronously or simultaneously
	Out put	CW, CCW, HOLE OFF (5V, 8mA: line driven) for each 16 motor
	Pulse rate	１～５ＭＰＰＳ
	Pulse control	０～±２，１４７，４８３，６４７
	Acc/dec rate	1048.56～0.0125 ms/KHz
	Acc/dec form	Constant speed, S-character form, Trapezoidal form
	Output format	２pulse／１pulse and direction
	Pulse out	DE9S(F)/PM16C-04XD(L), RJ-4/PM16C-04XR(L)
	LS signal in	CW-LS, CCW-LS, HOME-LS 12V 5mA(GND - common) Power supply +12V(MAX 1A) for sensor
	LS in	DE9P(M)/PM16C-04XD(L), RJ-4/PM16C-04XR(L)
LCD display	LCD display specification	PM16C-04XD : 40 characters×4 lines(Size: 4.9H*2.8W) PM16C-04XDL: 20 characters×4 lines(Size: 9.2H*4.8W)
	Contents in control mode	channel number, current position of ±10 digit number, speed display, contents of limit switch, relative moving value, preset count value, home position information, paneloperation ready/not ready
	Contents in data set mode	limit switch setting information, pulse output mode, value of speed HSPD/MSPD/LSPD, acceleration and deceleration rate value, Push button stop mode, origin detect function, timing pulse generate function, RS232C settings, GP-IB settings, HAND BOX selection, FIRMWARE version selection
panel push button and lamp	PM16C-04XD	switch/button : JOG CW/CCW, PRESET,START,STOP,REM/LOC,SETUP REM/LOC,CURSOR,CHG,MODE,TEN-KEY lamp : REM/LOC,START,STOP,SETUP,HP/REL/ABS/SCAN
	PM16C-04XDL	switch/button: CH-SEL, JOG CW/CCW, channel act,REM/LOC, SETUP, PRESET, START, STOP, CURSOR, CHG, MODE,TEN-KEY lamp: limit switch, home position, hold off, motor select, PRESET, START, STOP, REM/LOC, SETUP, MODE
ten-key and cursor key		channel selection by ten-key and cursor key. Selection of control ready/not ready for each channel, and change preset values. selectable speed of H, M, L for each channel. and preset speed value of H,M,L for each channel.
control	PRESET START STOP JOG	preset specified data to the selected display moving start for selected channel according to the mode stop moving for selected channel jog stepping for selected channel
stepping mode	SCAN MODE	continuous stepping of ready ch. Stepping direction is according to JOG switch
	ABS IDX MODE	move ready ch to absolute position
	REL IDX MODE	move ready ch specified steps relatively
	HP STOP MODE	Stop by HOME POSITION LS total 3 moving style. One is for with HP detection memory, another two are for no HP detection memory.
remote	communication	LAN, GP-IB, RS232C port
case	size	EIA 2 UNIT rack mount type (88H×482W×325D)