JPS

PDS series general question

目錄(Catalog)

1..馬達基本參數之說明?

A:參數組別

首先必須設定 Pr.188 選擇參數組別。

本驅動器可同時設定儲存 4 組馬達參數 ; 在開機時由 Pr.188 決定驅動器使用的馬達參數組別。

Pr.188=0, 使用第 0 組馬達參數(Pr.300~349)。

Pr.188=1, 使用第 1 組馬達參數(Pr.350~399)。

Pr.188=2, 使用第 2 組馬達參數(Pr.400~449)。

Pr.188=3, 使用第 3 組馬達參數(Pr.450~499)。

一般習慣，當使用 AC 感應伺服馬達時，請選擇 Pr.188=0，使用第 0 組馬達參數(Pr.300~349)。

一般習慣，當使用 AC 永磁伺服馬達時，請選擇 Pr.188=3，使用第 3 組馬達參數(Pr.450~499)。

參數分類(在所選定的參數組別之內, 沒有使用到的參數需設定為 0)

電機基本特性相關參數

Pr.300/350/400/450 選擇馬達種類

=0, 使用感應馬達於 V/F 控制模式

=1, 使用感應馬達於無感測控制模式

=2, 使用 AC 感應伺服馬達

=3, 使用 AC 永磁無刷伺服馬達

Pr.307/357/407/457 馬達額定電壓(%)

馬達額定電壓 / 電源電壓) * 100%

Pr.308/358/408/458 馬達最大電壓(%)

最高轉速時之馬達容許電壓 / 電源電壓) * 100%

Pr.309/359/409/459 轉矩提升電壓(%)

V/F 模式時，轉矩提升電壓

AC 感應馬達才需要設定.

Pr.310/360/410/460 馬達額定轉速(RPM)

馬達額定轉速

Pr.311/361/411/461 馬達額定電流(%)

馬達額定電流 / 驅動器額定電流) * 100%

Pr.312/362/412/462 馬達最大電流(%)

馬達最大容許電流 / 馬達額定電流) * 100%

Pr.313/363/413/463 感應馬達激磁電流(%)

馬達激磁電流 / 馬達額定電流) * 100%

AC 感應馬達才需要設定.

Pr.314/364/414/464 馬達極數(Pole)

馬達極數

Pr.315/365/415/465 馬達最高容許轉速

馬達最高容許轉速以 RPM 計

Pr.316/366/416/466 馬達最低容許轉速

馬達最低容許轉速以 RPM 計

Pr.317/367/417/467 感應馬達滑差速(RPM)

感應馬達之滑差速以RPM 計
AC 感應馬達才需要設定.
Pr.342/392/442/492 永磁馬達之繞線方向
AC 永磁伺服才需要設定, 依各廠牌生產繞線方向選擇之(請洽本公司應用部門)
回授元件相關參數
Pr.302/352/402/452 ENCODER 每轉脈波數
設定Encoder 之PPR
Pr.303/353/403/453 正轉時 A 領先B 或 A 落後B
修正Encoder 回授之方向
Pr.304/354/404/454 ENCODER 濾波量
修正Encoder 輸入濾波量或取樣時間(sampling time)
Pr.340/390/440/490 RESOLVER 角度偏移量
設定馬達磁北極和解角器磁北記號的角度偏移量
AC 永磁伺服才需要設定, 依各廠牌之不同選擇之(請洽本公司應用部門).
Pr.341/391/441/491 RESOLVER 極性
設定解角器信號極性
AC 永磁伺服才需要設定, 依各廠牌之不同選擇之(請洽本公司應用部門)
觀測監視相關參數
Pr.301/351/401/451 ENCODER 之A.B.C.輸入狀態
監看Encoder 之輸入狀態
Pr.305/355/405/455 ENCODER 計數器
以HEX 格式讀出Encoder 計數器的內容
Pr.306/356/406/456 ENCODER 之UVW 輸入狀態
監看無刷伺服U.V.W.磁極回授信號
AC 永磁伺服安裝有U,V,W 磁極回授信號之Encoder 才可觀測.
Pr.318/368/418/468 實測ENCODER 每轉脈波數
記錄馬達每迴轉所偵測得到的脈沖數，所偵測值為Encoder 每轉脈波數的4 倍頻。
運轉模式相關參數
Pr.330/380/430/480 速度或位置控制模式選擇
=0, 速度控制模式
=1, 位置控制模式
Pr.331/381/431/481 自動定位或追蹤模式選擇
=0, 點對點長度控制 (APTP)
=1, 追蹤或脈沖控制模式(Pcmd)
Pr.332/382/432/482 增量或絕對位置模式選擇
=0, 增量/相對位置定位模式
=1, 絕對位置式定位模式
使用於自動點對點(APTP)模式
Pr.333/383/433/483 轉矩限制來源選擇
=0, 最大容許電流限制
=1, 由類比輸入AI1 限制
=2, 類比輸入AI2 限制

=3, 類比輸入AI3 限制
=4, Pr.067 設定 (RAM)
=5, PID block 之輸出做限制
=6, Pr.069 設定 (EAROM)
=7, 類比輸入AI1 * AI2 做限制
Pr.334/384/434/484 長度轉換選擇
使用於自動點對點(APTP)模式
Pr.335/385/435/485 長度補償
使用於自動點對點(APTP)模式
Pr.336/386/436/486 長度補償極性
使用於自動點對點(APTP)模式
Pr.343/393/443/493 轉矩控制模式選擇
=0, 標準控制模式, 由Pr.333/383/433/483 選擇轉矩限制之來源
=1, 直接轉矩控制模式, 由 AI1 輸入之大小與極性當成轉矩命令
Pr.344/394/444/494 自動點對點(APTP) S 曲線選擇
=0,直線APTP
=1,S 曲線APTP
使用於自動點對點(APTP)模式
控制增益特性相關參數
Pr.319/369/419/469 保留，一般應用請設定為0
Pr.320/370/420/470 電流回路之比例增益
Pr.321/371/421/471 電流回路之積分增益
Pr.322/372/422/472 保留，一般應用請設定為0
Pr.323/373/423/473 速度回路之比例增益
Pr.324/374/424/474 速度回路之積分增益
Pr.325/375/425/475 保留，一般應用請設定為0
Pr.326/376/426/476 位置回路之比例增益
Pr.327/377/427/477 保留，一般應用請設定為0
Pr.328/378/428/478 保留，一般應用請設定為0
Pr.329/379/429/479 保留，一般應用請設定為0
(在所選定的參數組別之內, 其他沒有使用到的參數需設定為0)

2. AC 感應伺服馬達的基本設定?

A:參數組別

首先必須設定 Pr.188 選擇參數組別。

本驅動器可同時設定儲存 4 組馬達參數 ; 在開機時由 Pr.188 決定驅動器使用的馬達參數組別。

Pr.188=0, 使用第0 組馬達參數(Pr.300~349)。

Pr.188=1, 使用第1 組馬達參數(Pr.350~399)。

Pr.188=2, 使用第2 組馬達參數(Pr.400~449)。

Pr.188=3, 使用第3 組馬達參數(Pr.450~499)。

一般習慣，當使用AC 感應伺服馬達時，請選擇 Pr.188=0，使用第 0 組馬達參數(Pr.300~349)。

電機基本特性相關參數

Pr.300 選擇馬達種類

=2, 使用AC 感應伺服馬達

Pr.307 馬達額定電壓(%)

(馬達額定電壓 / 電源電壓) * 100%

Pr.308 馬達最大電壓(%)

(最高轉速時之馬達容許電壓 / 電源電壓) * 100%

Pr.309 轉矩提升電壓(%)

V/F 模式時，轉矩提升電壓

Pr.310 馬達額定轉速(RPM)

馬達額定轉速

Pr.311 馬達額定電流(%)

(馬達額定電流 / 驅動器額定電流) * 100%

Pr.312 馬達最大電流(%)

(馬達最大容許電流 / 馬達額定電流) * 100%

Pr.313 感應馬達激磁電流(%)

(馬達激磁電流 / 馬達額定電流) * 100%

Pr.314 馬達極數(Pole)

馬達極數

Pr.315 馬達最高容許轉速

馬達最高容許轉速以RPM 計

Pr.316 馬達最低容許轉速

馬達最低容許轉速以RPM 計

Pr.317 感應馬達滑差速(RPM)

感應馬達之滑差速以RPM 計

Pr.342 永磁馬達之繞線方向

=0, AC 感應伺服馬達不需要設定.

回授元件相關參數

Pr.302 ENCODER 每轉脈波數

設定Encoder 之PPR

Pr.303 正轉時 A 領先B 或 A 落後B

修正Encoder 回授之方向

Pr.304 ENCODER 濾波量
修正Encoder 輸入濾波量或取樣時間(sampling time)
Pr.340 RESOLVER 角度偏移量
=0, AC 感應伺服馬達不需要設定.
Pr.341 RESOLVER 極性
=0, AC 感應伺服馬達不需要設定.
觀測監視相關參數
Pr.301 ENCODER 之A.B.C.輸入狀態
監看Encoder 之輸入狀態
Pr.305 ENCODER 計數器
以HEX 格式讀出Encoder 計數器的內容
Pr.306 ENCODER 之UVW 輸入狀態
AC 感應伺服馬達不需要監看U.V.W.磁極回授信號
Pr.318 實測ENCODER 每轉脈波數
記錄馬達每迴轉所偵測得到的脈沖數，所偵測值為Encoder 每轉脈波數的4 倍頻。
運轉模式相關參數
依應用之需要選擇
控制增益特性相關參數
視實際運轉狀況調整
(在所選定的參數組別之內, 其他沒有使用到的參數需設定為0)

3. AC 永磁伺服馬達的基本設定?

A:參數組別

首先必須設定 Pr.188 選擇參數組別。

本驅動器可同時設定儲存 4 組馬達參數 ; 在開機時由 Pr.188 決定驅動器使用的馬達參數組別。

Pr.188=0, 使用第0 組馬達參數(Pr.300~349)。

Pr.188=1, 使用第1 組馬達參數(Pr.350~399)。

Pr.188=2, 使用第2 組馬達參數(Pr.400~449)。

Pr.188=3, 使用第3 組馬達參數(Pr.450~499)。

一般習慣，當使用AC 永磁伺服馬達時，請選擇 Pr.188=3，使用第 3 組馬達參數(Pr.450~499)。

電機基本特性相關參數

Pr.450 選擇馬達種類

=3, 使用AC 永磁無刷伺服馬達

Pr.457 馬達額定電壓(%)

(馬達額定電壓 / 電源電壓) * 100%

Pr.458 馬達最大電壓(%)

(最高轉速時之馬達容許電壓 / 電源電壓) * 100%

Pr.459 轉矩提升電壓(%)

=0, AC 永磁無刷伺服馬達不需要設定.

Pr.460 馬達額定轉速(RPM)

馬達額定轉速

Pr.461 馬達額定電流(%)

(馬達額定電流 / 驅動器額定電流) * 100%

Pr.462 馬達最大電流(%)

(馬達最大容許電流 / 馬達額定電流) * 100%

Pr.463 感應馬達激磁電流(%)

=0, AC 永磁無刷伺服馬達不需要設定.

Pr.464 馬達極數(Pole)

馬達極數

Pr.465 馬達最高容許轉速

馬達最高容許轉速以RPM 計

Pr.466 馬達最低容許轉速

馬達最低容許轉速以RPM 計

Pr.467 感應馬達滑差速(RPM)

=0, AC 永磁無刷伺服馬達不需要設定.

Pr.492 永磁馬達之繞線方向

依各廠牌生產繞線方向選擇之(請洽本公司應用部門).

回授元件相關參數

Pr.452 ENCODER 每轉脈波數

設定Encoder 之PPR

Pr.453 正轉時 A 領先B 或 A 落後B

修正Encoder 回授之方向

Pr.454 ENCODER 濾波量
修正Encoder 輸入濾波量或取樣時間(sampling time)
Pr.490 RESOLVER 角度偏移量
設定馬達磁北極和解角器磁北記號的角度偏移量
依各廠牌之不同選擇之(請洽本公司應用部門)
Pr.491 RESOLVER 極性
設定解角器信號極性
依各廠牌之不同選擇之(請洽本公司應用部門).
觀測監視相關參數
Pr.451 ENCODER 之A.B.C.輸入狀態
監看Encoder 之輸入狀態
Pr.455 ENCODER 計數器
以HEX 格式讀出Encoder 計數器的內容
Pr.456 ENCODER 之UVW 輸入狀態
監看無刷伺服U.V.W.磁極回授信號
AC 永磁伺服安裝有U,V,W 磁極回授信號之Encoder 才可觀測.
Pr.468 實測ENCODER 每轉脈波數
記錄馬達每迴轉所偵測得到的脈沖數，所偵測值為Encoder 每轉脈波數的4 倍頻。
運轉模式相關參數
依應用之需要選擇
控制增益特性相關參數
視實際運轉狀況調整
(在所選定的參數組別之內, 其他沒有使用到的參數需設定為0)

4. 如何執行速度控制模式?

A:參數組別

首先必須設定 Pr.188 選擇參數組別。

本驅動器可同時設定儲存 4 組馬達參數 ; 在開機時由 Pr.188 決定驅動器使用的馬達參數組別。

Pr.188=0, 使用第0 組馬達參數(Pr.300~349)。

Pr.188=1, 使用第1 組馬達參數(Pr.350~399)。

Pr.188=2, 使用第2 組馬達參數(Pr.400~449)。

Pr.188=3, 使用第3 組馬達參數(Pr.450~499)。

一般習慣，當使用AC 感應伺服馬達時，請選擇 Pr.188=0，使用第 0 組馬達參數(Pr.300~349)。

一般習慣，當使用AC 永磁伺服馬達時，請選擇 Pr.188=3，使用第 3 組馬達參數(Pr.450~499)。

本例中以AC 感應伺服馬達來執行速度控制之運用 ，選擇 Pr.188=0，使用第 0 組馬達參數 (Pr.300~349)。

電機基本特性相關參數 及 回授元件相關參數-請參考馬達基本參數之說明

運轉模式相關參數

Pr.330 速度或位置控制模式選擇

=0, 速度控制模式

Pr.331 自動定位或追蹤模式選擇

=0, 在速度控制模式之下,沒有任何作用.

Pr.332 增量或絕對位置模式選擇

=0, 在速度控制模式之下,沒有任何作用.

Pr.333 轉矩限制來源選擇

=0, 不使用轉矩(電流)限制

Pr.334 長度轉換選擇

=0, 在速度控制模式之下, 沒有任何作用.

Pr.335 長度補償

=0, 在速度控制模式之下, 沒有任何作用.

Pr.336 長度補償極性

=0, 在速度控制模式之下, 沒有任何作用.

Pr.343 轉矩控制模式選擇

=0, 標準控制模式, 由Pr.333 選擇轉矩限制之來源

Pr.344 自動點對點(APTP) S 曲線選擇

=0, 在速度控制模式之下, 沒有任何作用.

控制增益特性相關參數

Pr.319=0, 保留

Pr.320=50, 電流回路之比例增益

Pr.321=50, 電流回路之積分增益

Pr.322=0, 保留

Pr.323=500, 速度回路之比例增益

Pr.324=50, 速度回路之積分增益

Pr.325=0, 保留

Pr.326=0, 位置回路之比例增益, 在速度控制模式之下, 沒有任何作用.

其他基本運轉相關參數(參考使用說明書)

Pr.000=500, 速度命令設定值(Rpm)
Pr.001=5.00, 加速時間設定值(Sec)
Pr.002=5.00, 減速時間設定值(Sec)
Pr.039=0.0, 選擇運轉命令由操作面板控制
Pr.181=0, 選擇操作面板為LOCAL 操作面板控制
Pr.040=0.00, 選擇速度命令由Pr.000 設定
Pr.141=102, DI1(102)設定為Enable 輸入端子
開始運轉
將DI1 與Dcom 短路, 則馬達即有激磁電流
在面板之CTL 控制模式下, 按FWD 鍵, 馬達即運轉至 500Rpm

5. 如何執行扭力控制?

A:PDS 系列之伺服驅動器可以執行兩種扭力(轉矩)控制方式:
Mode-0: 標準速度模式下之扭力限制功能
Mode-1: 直接扭力控制方式
(本例中, 假設 Pr.188=0，馬達參數選用Pr.300~Pr.349 請參考如何執行速度模式?)
Mode-0: 標準速度模式下之扭力限制功能(Speed Control with Torque Limit)
令Pr.343 = 0，即可在開機時自動進入本模式。
速度命令由Pr.040 決定。
若負載所需之扭力小於Torque-Limit 設定值，
則運轉速度可以達到與速度命令相同。
若負載所需之扭力大於Torque-Limit 設定值，
則運轉速度將降低，無法與速度命令相同。
Torque-Limit 設定值之來源由Pr.333 決定, 有下列幾種選擇：
0：不限制，Torque-Limit 可輸出至最大極限。
(最大極限即Pr.312 決定之最大電流)
1：由AI1(選0~+5V or 0~+10V)之輸入電壓決定Torque-Limit。
2：由AI2(選0~+5V or 0~+10V)之輸入電壓決定Torque-Limit。
3：由AI3(選0~+5V or 0~20ma)之輸入電壓或電流決定Torque-Limit。
4：由Pr.067 決定。Pr.067 之範圍 0.00~100.00%。
(每次開電源或復歸後Pr.067=0.00)
5：由PID Block 之輸出(即abs(Pr.242))決定。
6：由 Pr.069 決定。Pr.069 之範圍 0~100%。
(V8.97~，關電或復歸不影響Pr.069)
7：由AI1 * AI2 決定(V9.21~)。
選擇 Torque Limit 方式：
Pr.333=a.b ，Pr.333 可以同時設定兩組數字 a 與 b 。 其範圍 a =0~7，b=0~7。
基本上, 由 a 之設定來選擇 Torque-Limit 設定值之來源。
但是, 如果有任何輸入端子功能設定為 DIx(108)，則
DIx(108)=OFF：由a 之設定來選擇Torque-Limit 設定值之來源。
DIx(108)=ON： 由b 之設定來選擇Torque-Limit 設定值之來源。
Mode-1: 直接扭力控制方式(Direct Torque Control with Speed Limit)
(V9.07~以上，新追加功能)
令Pr.343 = 1，即可在開機時自動進入本模式。
Torque Command 必須由AI1(bi-directional input)輸入
Pr.500=Forward Speed Limit(正轉速度限制)
Pr.502=Reverse Speed Limi t(反轉速度限制)
運轉中切換扭力控制模式之方法
(V9.07~以上，新追加功能)
若有任何輸入端子功能設定DIx(208)，則不管Pr.343 之設定為何，
扭力控制模式由 DIx(208)決定。

DIx(208)=OFF， Mode-0： Speed control with Torque Limit

DIx(208)=ON， Mode-1： Torque control with Speed Limit

6. 如何觀察輸出扭力之大小?

A:How to check Torque Output in digital form?

Set Pr.589=5, then Pr.599 will show the output torque in Hex form.

How to check Torque Output in analog form?

We can also use analog waveform to verify the torque output, assume AO1 is used as the analog output pin.

1. Select Pr.210=8, then AO1 will show the bi-directional torque output waveform.
2. Select Pr.210=9, then AO1 will show the absolute value of torque output waveform.

Then, observe AO1 while tracking in process.

ex. When AO1 output is +10Volts, means motor generates maximum torque.

Note: All AOx have 10ms time delay.

7. 如何執行定位追蹤(Pcmd/Tracking)控制模式?

A:參數組別

首先必須設定 Pr.188 選擇參數組別。

本驅動器可同時設定儲存 4 組馬達參數 ; 在開機時由 Pr.188 決定驅動器使用的馬達參數組別。

Pr.188=0, 使用第0 組馬達參數(Pr.300~349)。

Pr.188=1, 使用第1 組馬達參數(Pr.350~399)。

Pr.188=2, 使用第2 組馬達參數(Pr.400~449)。

Pr.188=3, 使用第3 組馬達參數(Pr.450~499)。

一般習慣，當使用AC 感應伺服馬達時，請選擇 Pr.188=0，使用第 0 組馬達參數(Pr.300~349)。

一般習慣，當使用AC 永磁伺服馬達時，請選擇 Pr.188=3，使用第 3 組馬達參數(Pr.450~499)。

本例中以AC 感應伺服馬達來執行速度控制之運用 ，選擇 Pr.188=0，使用第 0 組馬達參數 (Pr.300~349)。

電機基本特性相關參數 及 回授元件相關參數 請參考馬達基本參數之說明

運轉模式相關參數

Pr.330 速度或位置控制模式選擇

=1, 位置控制模式

Pr.331 自動定位或追蹤模式選擇

=1, Pcmd/Tracking 追蹤模式

Pr.332 增量或絕對位置模式選擇

=0, 在位置追蹤模式之下, 沒有任何作用.

Pr.333 轉矩限制來源選擇

=0, 不使用轉矩(電流)限制

Pr.334 長度轉換選擇

=0, 在位置追蹤模式之下, 不使用.

Pr.335 長度補償

=0, 在位置追蹤模式之下, 不使用.

Pr.336 長度補償極性

=0, 在位置追蹤模式之下, 不使用.

Pr.343 轉矩控制模式選擇

=0, 在位置追蹤模式之下, 不使用.

Pr.344 自動點對點(APTP) S 曲線選擇

=0, 在位置追蹤模式之下, 不使用.

控制增益特性相關參數

Pr.319=0, 保留

Pr.320=50, 電流回路之比例增益

Pr.321=50, 電流回路之積分增益

Pr.322=0, 保留

Pr.323=500, 速度回路之比例增益

Pr.324=50, 速度回路之積分增益

Pr.325=0, 保留

Pr.326=100, 位置回路之比例增益, 在位置控制模式之下, 依系統特性調整之.

其他基本運轉相關參數(參考使用說明書)
Pr.039=0.0, 選擇運轉命令由操作面板控制
Pr.181=0, 選擇操作面板為LOCAL 操作面板控制
Pr.141=102, DI1(102)設定為Enable 輸入端子
本應用特殊參數(參考使用說明書)
Pr.130 可以選擇由 X/Y input 輸入之脈沖信號之型式,
=0, 4 倍率之雙向脈波(Two Phase)
=1, 計數脈波(Colck Pulse)及方向信號(Direction)
=2, 上數脈波(UP-clock)及下數脈波(DOWN-clock)
=3, 2 倍率之雙向脈波(Two Phase)
Pr.132 可以改變由 X/Y input 輸入之脈沖信號之方向,
Pr.133 可以改變由 X/Y input 輸入之脈沖信號之乘數倍率,
Pr.134 可以改變由 X/Y input 輸入之脈沖信號之除數倍率,
開始運轉
將DI1 與Dcom 短路, 則馬達即有激磁電流
在面板之CTL 控制模式下, 按FWD 鍵, 馬達即進入追蹤模式
由 X/Y input 加入脈沖信號, 馬達即執行定位追蹤動作.

8. 如何觀察追蹤誤差值?

A:How to check Tracking Error in digital form?

In Tracking mode,

Set Pr.589=3, then Pr.590~Pr.595 are used to check the Position Loop status.

Pr.591/590 : Position Command value(32bits Hex)

Pr.593/592 : Position Feedback value(32bits Hex)

Pr.595/594 : Position Error value(32bits Hex)

Normally, check Pr.594 is well enough.

How to check Tracking Error in analog form?

We can also use analog output to verify the tracking error waveform, assume AO1 is used as the output pin.

1. Select Pr.210=12, then AO1 will show the Position Error waveform while Tracking.
2. Set Pr.570=N, where N is the desired full scale error pulses.

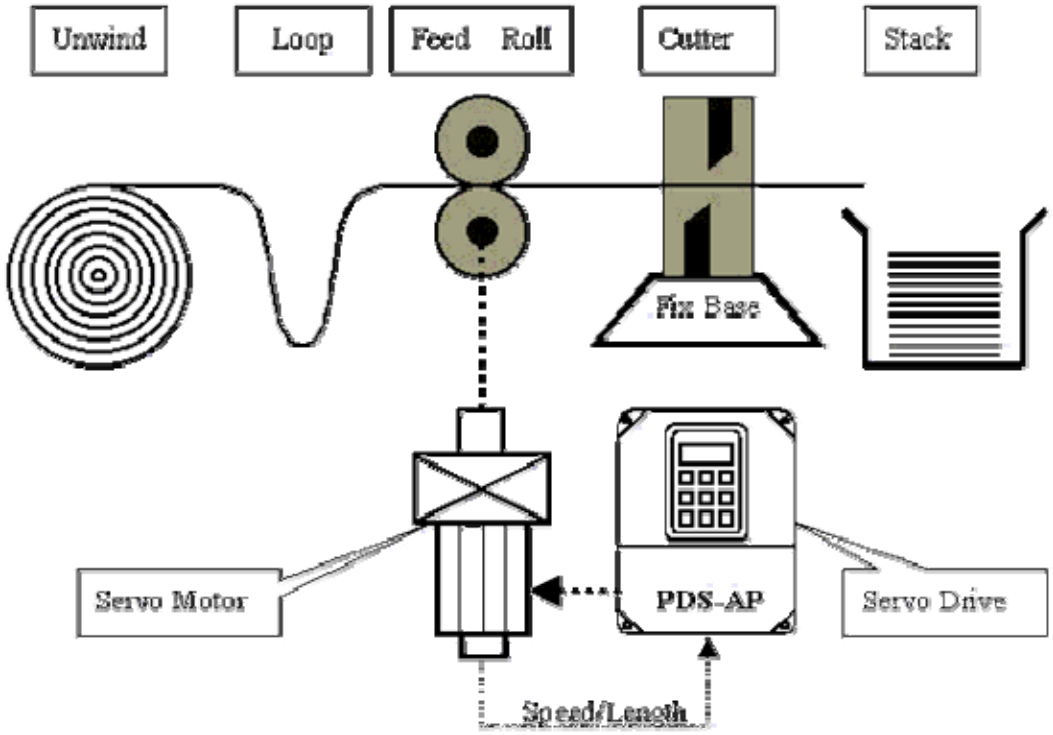
Then, observe AO1 waveform while tracking in process.

ex. When AO1output is +10Volts, means motor position lag N pulses.

Note: All AOx have 10ms time delay.

9. 如何執行自動定長送料(APTP)模式?

標準應用例



本例中以AC 感應伺服馬達來執行速度控制之運用 ，選擇 Pr.188=0，使用第 0 組馬達參數 (Pr.300~349)。

電機基本特性相關參數 及 回授元件相關參數 請參考馬達基本參數之說明

運轉模式相關參數

Pr.330 速度或位置控制模式選擇

=1, 位置控制模式

Pr.331 自動定位或追蹤模式選擇

=0, Auto Point To Point 模式

Pr.332 增量或絕對位置模式選擇

=0, 選擇增量型(incremental)運轉模式

Pr.333 轉矩限制來源選擇

=0, 不使用轉矩(電流)限制

Pr.334 長度轉換選擇

=1, 選擇長度自動轉換功能, 自動轉換1 組長度設定(DL16-->DL0)

Pr.335 長度補償

=0, 本例中不使用.

Pr.336 長度補償極性

=0, 本例中不使用.

Pr.343 轉矩控制模式選擇

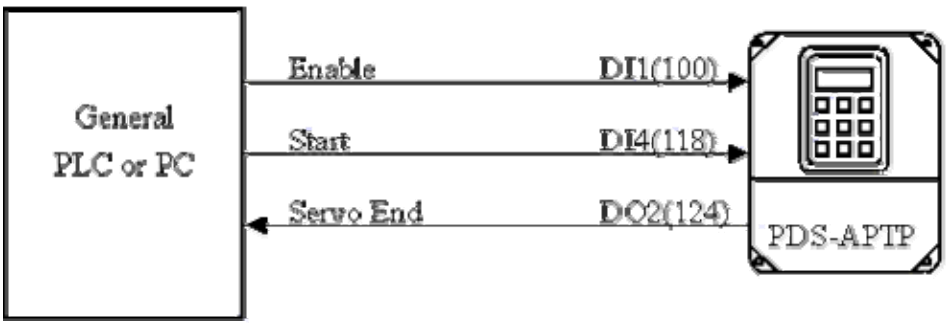
=0, 在位置追蹤模式之下, 不使用.

Pr.344 自動點對點(APTP) S 曲線選擇

=1, 使用 S 曲線加減速平滑

控制增益特性相關參數
Pr.319=0, 保留
Pr.320=50, 電流回路之比例增益
Pr.321=50, 電流回路之積分增益
Pr.322=0, 保留
Pr.323=500, 速度回路之比例增益
Pr.324=50, 速度回路之積分增益
Pr.325=0, 保留
Pr.326=100, 位置回路之比例增益, 在位置控制模式之下, 依系統特性調整之.
其他基本運轉相關參數(參考使用說明書)
Pr.039=1.0, 選擇運轉命令由操作面板控制
Pr.040=0.0, 選擇速度命令由Pr.000 控制
Pr.000=500, 選擇速度命令=500rpm
Pr.001=0.50, 選擇加速時間=0.50 秒
Pr.002=0.50, 選擇減速時間=0.50 秒
Pr.141=100, DI1(100)設定為Enable & RUN standby 輸入端子
本應用相關特殊參數(參考使用說明書)
Pr.577/576=um/revolution， 定義為馬達每轉之送料長度
Pr.533/532=xxxxxxxx(um), 預設之送料長度
本應用相關特殊I/O 功能(參考使用說明書)
DIx(118)=Trigger Start 輸入端子觸發後, 伺服定長開始
DOx(124)=Servo End 輸出端子, 表示伺服定長結束

標準控制接線圖



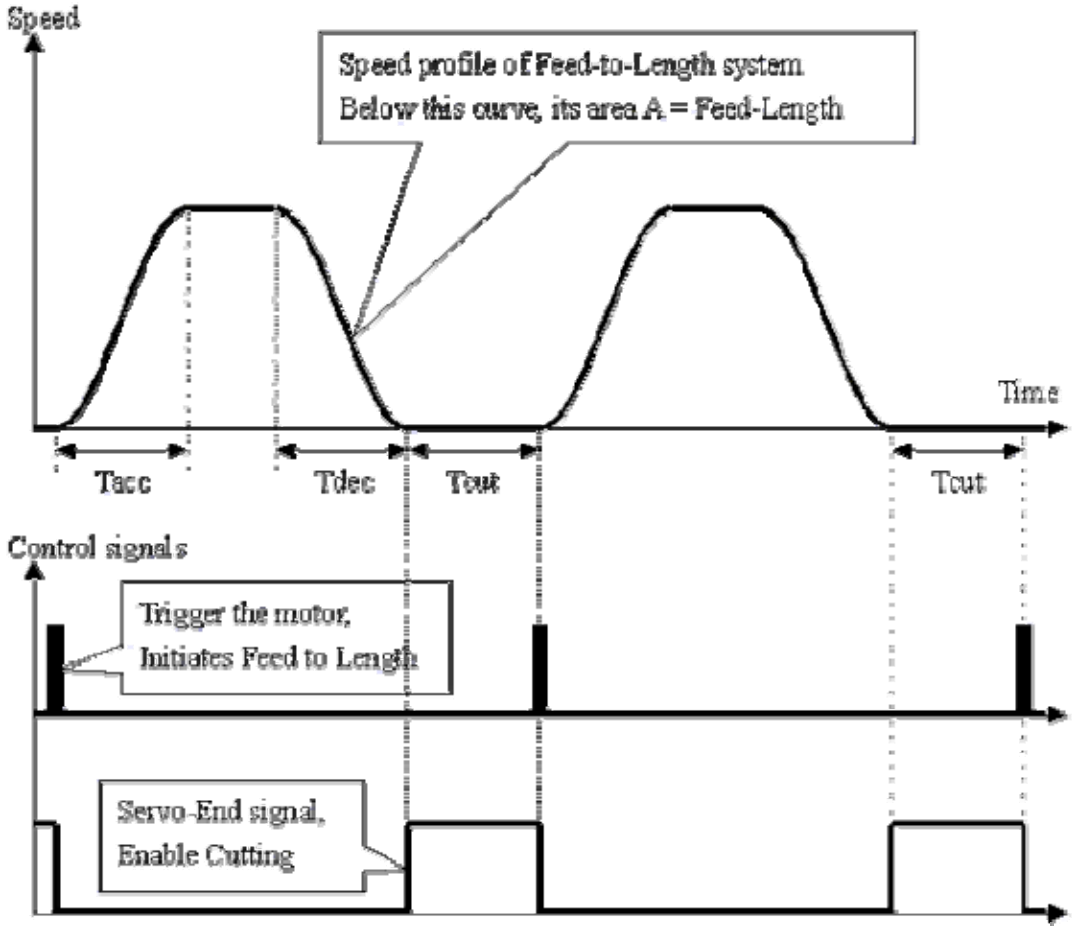
開始運轉

將DI1(100)與Dcom 短路, 則馬達即有激磁電流, 等待DI4(118)觸發信號

由DI4(118) 輸入端子加入觸發信號, 馬達即執行自動定長送料動作.

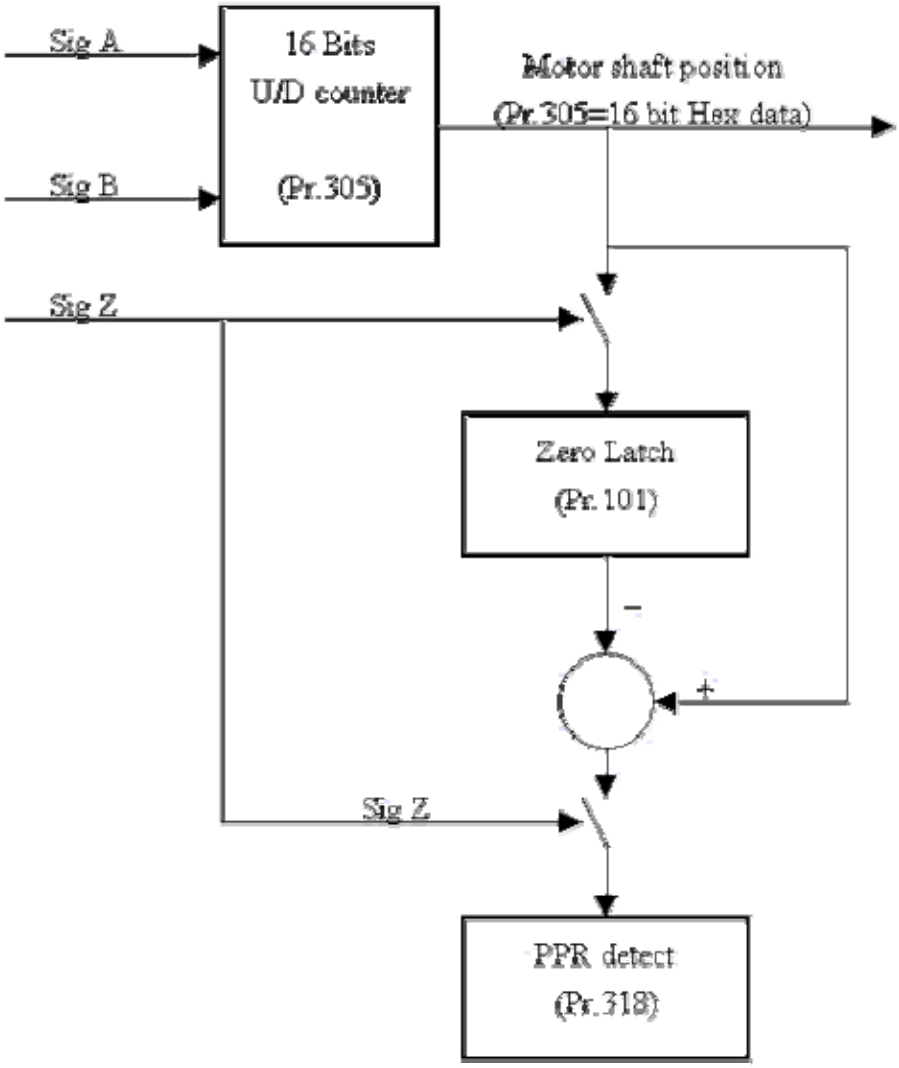
當DO2(124)=ON, 表示伺服定長結束; 並繼續等待下一次DI4(118)觸發信號

標準運行曲線圖



10. 判斷編碼器之好壞

如何判斷編碼器信號是否正常，是否受到雜訊干擾?



首先將Pr.100=64

手動檢查PG 之PPR

- 由上圖可知每次Z 點信號出現時CPU 會將Pr.305 之數字存入Pr.101
- 因此旋轉馬達一周Pr.101 將變化一次
- 觀察Pr.101 兩次變化間之差值即可得知馬達旋轉一周所得到的總脈沖數
- 由於CPU 內部使用4 倍頻回路，故實際PG 之PPR=總脈沖數/4
- 注意Pr.101 之數字為16 進制0x0000~0xffff
- 例如；

■ 第一次之值=0x1234，第二次之值0x2234

■ 差值=0x2234-0x1234=0x1000=4096(十進制)

■ PPR=4096/4=1024，以此數字設於Pr.302

• V9.33~ 以後之版本可以藉由Pr.318 判斷

手動檢查PG 之Z 點寬度

• 首先以正轉方向旋轉記錄 Pr.101 之數字

• 再以反轉方向旋轉記錄Pr.101 之數字

• 根據兩次記錄之差值即可得知Z 點寬度涵蓋幾個脈沖

• 例如；

■ 正轉之值=0x1234，反轉之值0x1238

■ 差值=0x1238-0x1234=0x0004=4(十進制)

■ 得知Z 點寬度涵蓋4 個脈沖

• V9.33~ 以後之版本可以藉由Pr.318 判斷

如何判斷PG 是否受到外界雜訊干擾?

根據以上說明可知：

• 只要在同向運轉中檢查 Pr.318 是否永遠為固定值即可判斷

11. 簡易觀察通信狀況之方法

How to check receive buffer?

Set Pr.589=10, then Pr.590~Pr.599 show the receiving bytes from RS485 serial port.

Pr.590=RX[0]

Pr.591=RX[1]

Pr.592=RX[2]

Pr.593=RX[3]

Pr.594=RX[4]

Pr.595=RX[5]

Pr.596=RX[6]

Pr.597=RX[7]

Pr.598=RX[8]

Pr.599=RX[9], only 10 bytes can be verified

How to check transmit buffer?

Set Pr.589=11, then Pr.590~Pr.599 show the data bytes transmit to RS485 serial port.

Pr.590=TX[0]

Pr.591=TX[1]

Pr.592=TX[2]

Pr.593=TX[3]

Pr.594=TX[4]

Pr.595=TX[5]

Pr.596=TX[6]

Pr.597=TX[7]

Pr.598=TX[8]

Pr.599=TX[9], only 10 bytes can be verified

How to check queue status when writing parameters into the PDS drive?

Any parameter write to the PDS drive is temporary stored into a queue buffer(size=30).

Pr.124 shows the status of the queue content.

If Pr.124=0, means the queue is empty.

If Pr.124=n, means the queue has n parameters waiting transfer to EEPROM(EAROM)

Before sending Parameter Write Command, must always check Pr.124 and guarantee its value is less than 25 .

12. 如何使兩台馬達完全同步運轉(Digital Lock)?

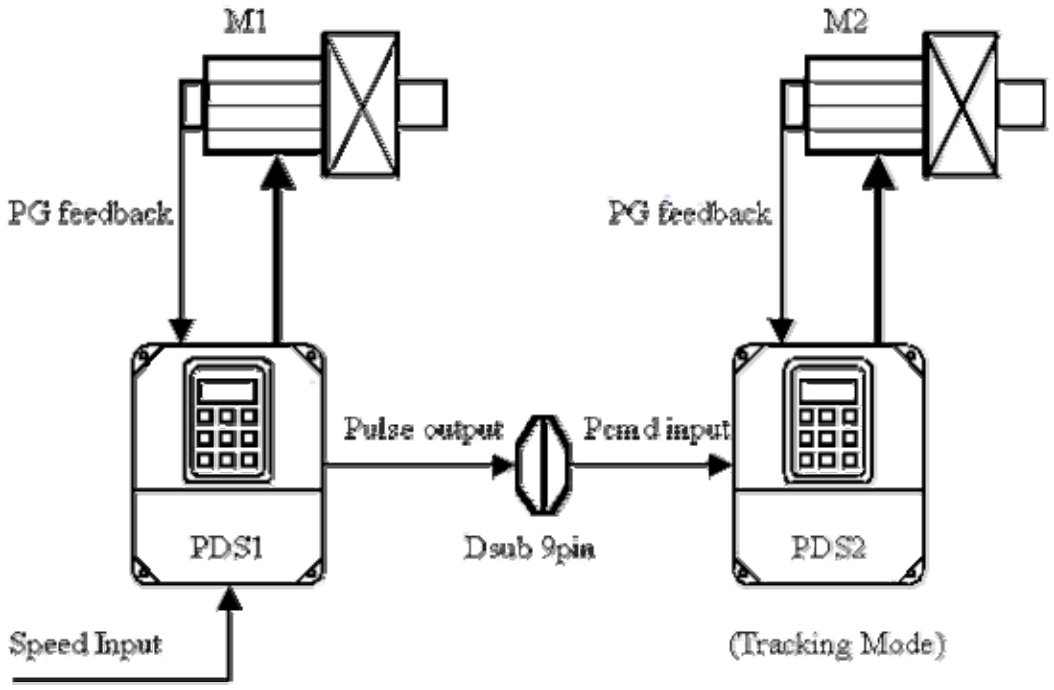
PDS 系列已經將數位同步功能(Digital Lock)視為驅動器的標準功能.

(請參考: 如何執行定位追蹤(Pcmd/Tracking)模式?)

使用相當方便, 如下圖所示:

只要將主機(M1)之 PG-Out 信號(Buffer 已內含)送至從機(M2)當成 Pcmd 輸入即可.

還可以由 Pr.133/Pr.134 改變追蹤之比例.(請參考使用說明書)



13. 有無捲徑計算功能?

PDS 系列之捲徑計算功能有多種選擇,
可以使用捲軸每轉一圈增加一層固定厚度之方式;
也可以利用材料線速度與捲軸轉速之關係計算出等效半徑.
而材料線速度之偵測可以使用電壓輸入; 也可以使用編碼器輸入方式.
另有補助功能, 如記憶停電前之半徑,...等等.
實際動作可以由下列參數指定之.
Radius Measurement Block, with Power-Loss backup (V8.92~)
Radius Measurement Block, with Power-Loss backup (V8.92~)
Pr.260 Radius_select
=0 No radius process
=1 Use analog input from AI1 as Radius value
=2 Use analog input from AI2 as Radius value
=3 Use analog input from AI3 as Radius value
=4
Calculate XY/AB clock ratio as Radius value(use Pr.135/Pr.136 as Gear Ratio)
=5
Use Winding TURNS pulse input to DIx(190) to increase Radius value
For each DIx(190) trigger input, add 1 to WIND_TURNS(Pr.273/272) data
Radius = Radius_Min + TURNS*thickness
DIx(192)=Preload Radius_Min into Radius_Output, and TURNS=0
=6
Use UnWinding TURNS pulse input to DIx(190) to decrease Radius value
For each DIx(190) trigger input, subtract 1 to WIND_TURNS data
Radius = Radius_Max - TURNS*thickness
DIx(191)=Preload Radius_Max into Radius_Output, and TURNS=0
=7 AI1 as Line speed input
=8 AI2 as Line Speed input
=9 AI3 as Line Speed input
Pr.261 Thickness or Minimum Threshold speed
when Pr.260=5 or 6 Pr.261=Thickness(0~999.9um) of each turn
when Pr.260=4
Pr.261=Minimum Speed(0~999.9RPM) for valid Calculation

Pr.263/262 PulsePerMeter or mmPerMinute
when Pr.260=4
used as XY_MeasureRoll_PPM,
0~99999999(PulsesPerMeter)
when Pr.260=7/8/9 used as Maximum-Line-Speed , 0~99999999(mm/Min)
Pr.265/264 Radius_Max, 0~9999999.9(mm)
Pr.267/266 Radius_Min, 0~9999999.9(mm)
Pr.269/268 Radius_BackUp, 0~9999999.9(mm)
Pr.271/270
Radius_Actual, 0~9999999.9(mm) RAM area(within Max
and Min)
Pr.273/272 WIND_TURNS, 0~99999999(Turns) RAM area
Pr.274 Radius_OUTPUT(HEX)
Aux. Functions Function Description
DIx(190) per described in Pr.260
DIx(191) per described in Pr.260
DIx(192) per described in Pr.260
DIx(193)
When selected DIx(193)=ON(trigger), execute
Radius_Backup
DIx(194)
When selected DIx(194)=OFF(trigger), execute
Radius_Backup
AOx(10)
Analog RADIUS output, when AOx(10)=+10V, means
r=100%=RADIUSmax

14. PDS 新增之追蹤功能(Additional Function for TRACKING-mode)

A. Standard Tracking function

For standard Pulse Command tracking function, these parameters was set

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=0, Normal Tracking mode

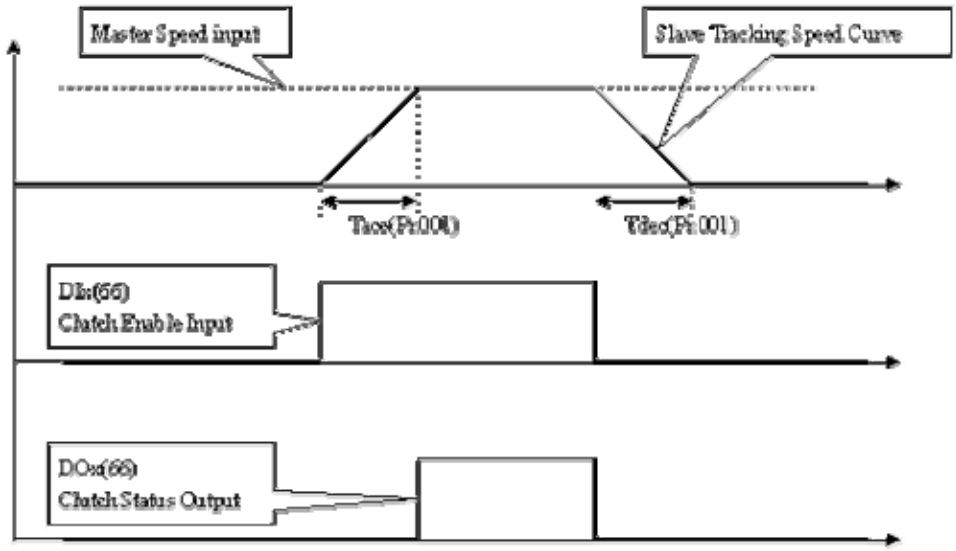
(Before V9.70 or When not assign any DIx(66))

In this mode, the tracking error is controlled at any instant.

However, the master speed input source must deal with the acceleration/deceleration time.

Else, if the master speed input clock is suddenly asserted,

the slave motor tracking speed will cause transient overshoot as the figure shown below.



Speed Curve of Soft-Clutch Tracking Mode

To avoid this phenomenon, additional two new tracking function is added after V9.70~.

B. Tracking function with Soft-Clutch (V9.70~)

Similar to the standard Pulse Command tracking function, these parameters was set

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=0.00(sec), Normal Tracking mode

Assign one DI as DIx(66)=Soft-Clutch function

Assign one DO as DOx(66)=Clutch Status output

This function can be referred as Soft-Clutch function.

Assume the Master motor is continuously running at high speed,

a mechanical Hard-Clutch can bring up the slave speed with inevitable machine shock.

For avoiding this machine shock, the Soft-Clutch function is designed

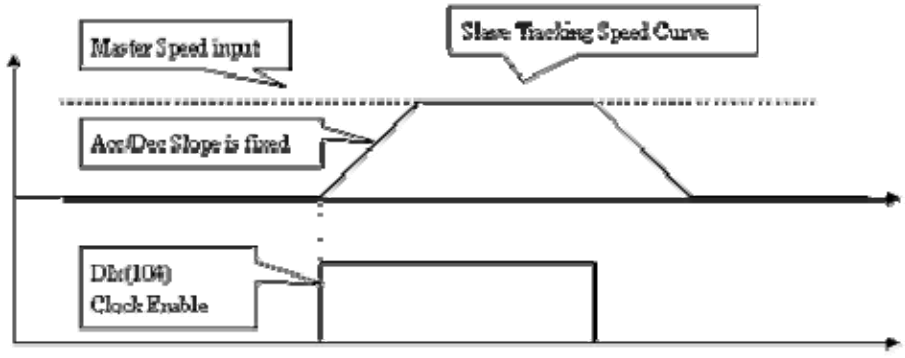
in order to bring the slave speed up smoothly using the pre-determined time assigned in Pr.001.

When the Clutch is totally engaged, an output function DOx(66) can be used to indicate the

Clutch status.

In the same manner, when the Soft Clutch is OFF, the slave speed is also decreased smoothly by the time assigned in Pr.001.

*Note: no matter what is the master speed input, the Clutch Engage/Degage time is always fixed to Pr.001.



Tracking Speed Curve for long distance tracking

C. Tracking function with Random Clock Input (V9.70~)

This mode is suitable when master clock pulse in randomly input to the slave.

The slave will track to the master speed and add acc and dec time automatically.

After the master stop sneding clocks, the slave will also stop and LOCK at the exect position as requested.

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=x.xx(sec), Ramp Tracking Acc/Dec time

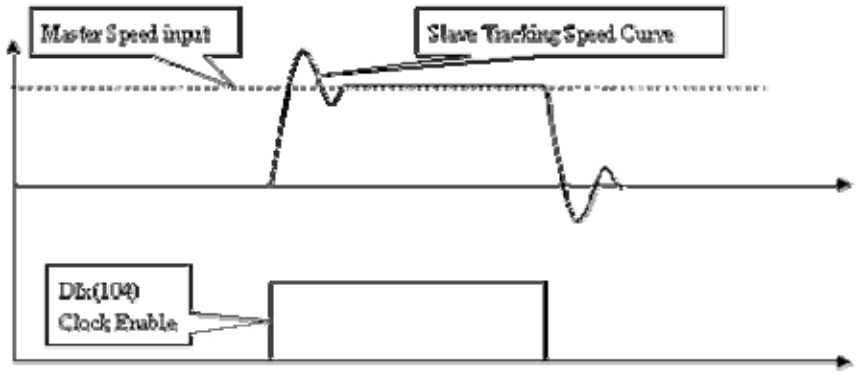
Assign one DI as DIx(104)=Clock-Enable function

Under this selection (when Ramp Tracking Time>0),

The slave tracking response for random clock input is shown in the following diagram.

If DIx(104) is ON, the output speed curve will ramp up/down using the constant defined in Pr.329/379/429/479

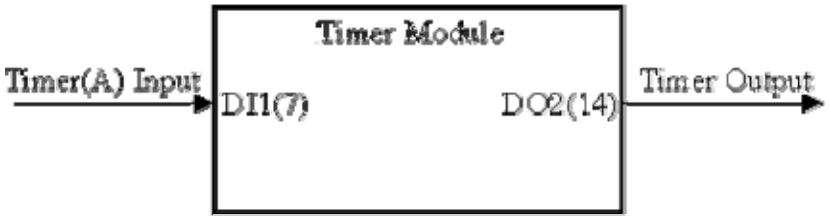
Note in this mode, the Soft-CLUTCH function is automatically disabled.



Speed Curve of Standard Tracking Mode

15. 何謂 DIx(n)? 何謂 DOx(n)?

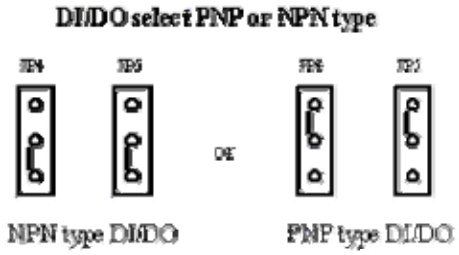
我們開發的各系列驅動器，皆為「 可規劃驅動器」 (Programmable Drive)
如 PDA：全名為 Programmable Drive, A-series
PDS：全名為 Programmable Drive, S-series
每個數位輸入(Digital Input)及數位輸出(Digital Output)端子，
都可以依照使用者之需求在衆多的功能選項中任意規劃。
DIx(n)的意義為：指定第 x 個 DI，從輸入功能選項中挑選第 n 項功能。
DOx(n)的意義為：指定第 x 個 DO，從輸出功能選項中挑選第 n 項功能。



如上圖, 內含計時器(TIMER)功能方塊的應用例中包含 DI1(7) 及 DO2(14)
DI1(7)表示--輸入端子DI1 之功能設定為 7(=計時器輸入)
DO2(14)表示--輸出端子DO2 之功能設定為 14(=計時器輸出)
(可以選擇的功能表列, 請參考各機種之說明書)

16. DI/DO 搭配 PLC 時, 可否選擇日系(NPN)或歐系(PNP)之 PLC?

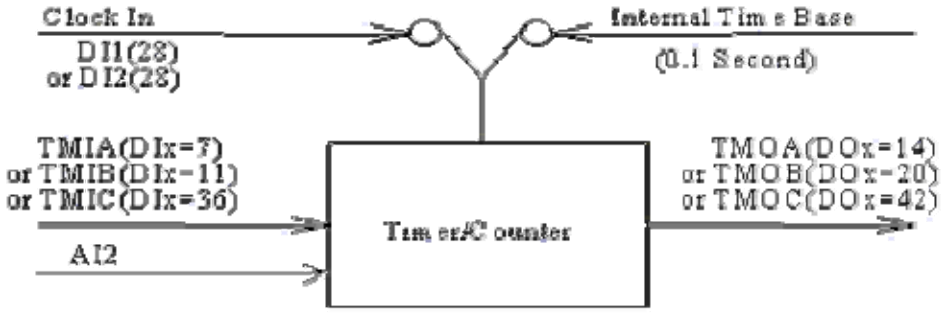
PD/PDE 系列僅能使用日系NPN 輸出入介面.
PDS/PDA/PDAn/PDH 系列, 均能靠 Jumper 選擇使用日系(NPN)或歐系輸出入介面.



如上圖,
選用日系(NPN)時, JP4/JP5 置於下方,選擇 TYPE1
選用歐系(PNP)時, JP4/JP5 置於上方, 選擇 TYPE2

17. 計時器如何使用?

所有 PDx 系列之驅動器, 均內含計時器方塊(TIMER)如下圖



Functional block diagram of TimerCounter module

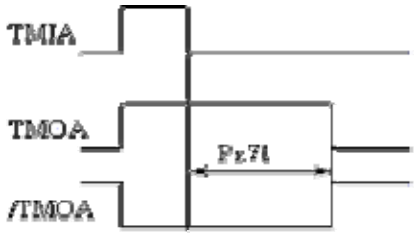
分三種基本工作模式:

延時開路式(Delay-OFF)

延時閉合式(Delay_ON)

開閉循環式(Auto ON/OFF)

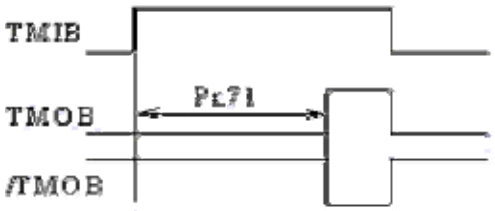
延時開路式(Delay-OFF)



如上圖當輸入TMIA(=DIx(7))為ON 時, 輸出TMOA(=DOx(14))立刻ON.

當輸入TMIA 由ON 變成OFF 時, 輸出TMOA 經過Pr.71 所設定的時間之後才OFF.

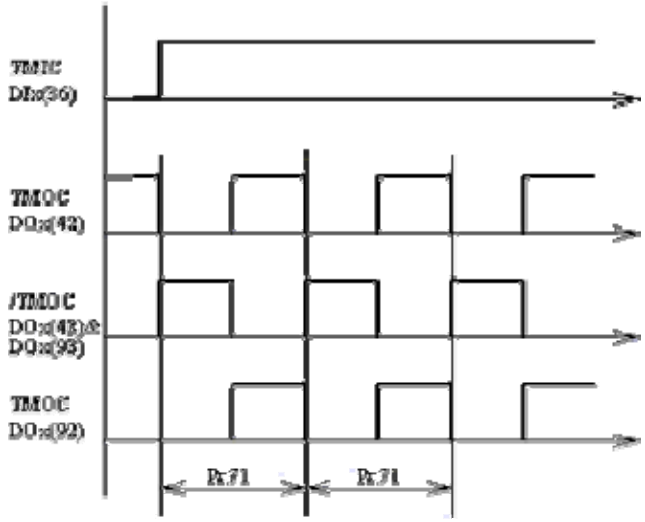
延時閉合式(Delay_ON)



如上圖當輸入TMIB(=DIx(11))為ON 時, 輸出TMOB(=DOx(20))經過Pr.71 所設定的時間之後才ON.

當輸入TMIB 由ON 變成OFF 時, 輸出TMOB 立刻OFF.

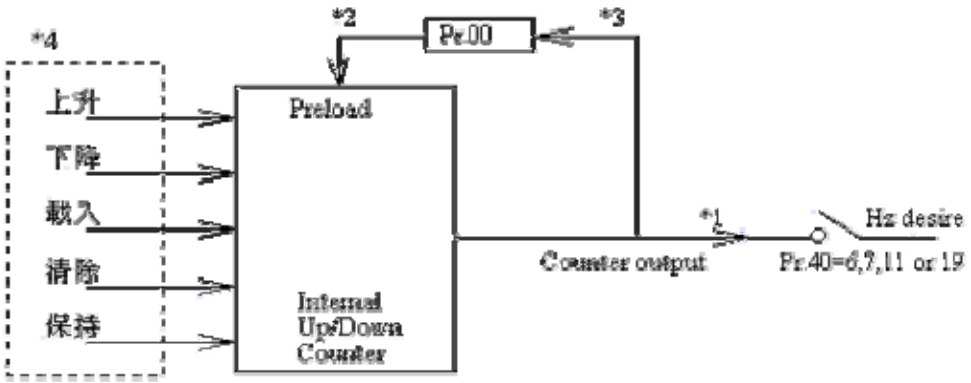
開閉循環式(Auto ON/OFF)



如上圖當輸入TMIC(=DIx(36))為ON 時,
輸出TMOC(=DOx(42)) 及/TMOC(=DOx(43)) 自動產生ON-OFF 動作(Duty-Cycle=50%, Total time=Pr.71)

18. 電子式調速器(Electronic Rheostat)如何使用?

所有 PDx 系列之驅動器, 均內含電子式調速器(Electronic Rheostat)如下圖



Functional Block Diagram of the Internal UP/DOWN Counter

僅靠數位輸入端子DIx 的動作, 就可以控制輸出轉速.
頻率上升或下降改變後, 也可以回寫入記憶體.
也可以停電記憶等...., 請詳閱說明書

19. 散熱風扇自動控制?

為了延長風扇之壽命, 在驅動器散熱片之溫度未超過45°C時, 可以停止運轉.
下列機種具有可以自動控制散熱風扇之運轉或停止之功能.
PDS/PDH/PDA/PDAn/PDE
實際散熱片之溫度可由 Pr.62 觀測.

20.各機種之通信能力如何?

各機種的通信能力說明如下：

PDA/H Series

可追加通信介面 RS485/ RS232

支援JPS protocol

速率:4800bps,9600bps,19200bps

PDAn Series

內含通信介面RS485

支援JPS protocol,Modbus(RTU)

速率:4800bps,9600bps,19200bps

PDS Series

內含通信介面RS485

支援JPS protocol,Modbus(RTU)

速率: 4800bps,9600bps,19200bps,38400bps

Option：Profibus-DP

IRIS Series

內含通信介面RS485

支援 Modbus(RTU)

速率: 19200bps

基板上之 RS485 connector, 信號定義：

21. RS485 JPS 格式串列通信說明

經由RS485 介面與驅動器之間的訊息溝通都是以ASCII 字串為之，結尾需加CR 符號(0x0d)。
電腦的通訊埠必須設定為：7 Bit data，Even Parity
電腦對驅動器有三種命令格式:
1. 運轉控制命令（驅動器無需回覆資料）
2. 參數書寫命令（驅動器無回覆資料）
3. 參數讀取命令（驅動器在將會回覆參數值及運轉狀況）
驅動器對電腦僅有一種命令格式:
回覆參數值及運轉狀態

運轉控制命令

命令格式 【C， uu ， cc ， fffff 】
C ：運轉控制命令之起始字元。
uu ：通信位址，指定第uu 台接收本字串。uu(ID)可指定為第00~99 台。
若 uu = 00，則所有的驅動器都必須接受命令。
cc ：十進制運轉控制命令代碼(00~15)。由四個二進制信號組成之，
cc= 8 * Bit-3(寸動) + 4 * Bit-2(逆轉) + 2 * Bit-1(正轉) + Bit-0(復歸)
fffff ：速度設定值。
控制碼cc 功能
cc=00 停止
cc=01 復歸
cc=02 正向運轉
cc=06 逆向運轉
cc=10 寸動正轉
cc=14 寸動逆轉

參數書寫命令

命令格式 【W， uu ， nn ， ddddd 】或【W， uu ， nnn ， ddddd 】
W ：參數書寫命令之起始字元。
uu ：通信位址，指定第uu 台接收本字串。uu(ID)可指定為第00~99 台。
若 uu = 00，則所有的驅動器都必須接受命令。
nn ：依機種別， 參數號碼為兩位數 "nn"者，參數號碼由00~99。
(或nnn ：依機種別，參數號碼為三位數 "nnn"者，參數號碼由000~999。)
ddddd ：欲寫入之參數值，由 00000 ~ 65535。

參數讀取命令

命令格式 【R， uu ， nn 】或 【R， uu ， nnn 】

R ：參數讀取命令之起始字元。

uu ：通信位址，指定第uu 台接收本字串。uu(ID)可指定為第00~99 台。

若 uu = 00，則所有的驅動器都必須接受命令。

nn ：依機種別， 參數號碼為兩位數 "nn"者，參數號碼由 00~99。

(或 nnn ：依機種別，參數號碼為三位數 "nnn"者，參數號碼由 000~999。)

驅動器回覆電腦的訊息

在驅動器接到要求的參數讀取命令時，即刻開始回覆該參數及當時之運轉資料。

回覆訊息之格式 【P， uu ， nn ， tt ， ddddd ， s ， aaaa 】或

【P， uu ， nnn ， tt ， ddddd ， s ， aaaa 】

P ：參數回覆訊息之起始字元。

uu ：指出本字串為第 uu 台之回覆訊息。

由各驅動器的參數 Pr.093 決定本身之通信位址。

nn ：依機種別， 參數號碼為兩位數 "nn"者，參數號碼由00~99。

(或nnn ：依機種別，參數號碼為三位數 "nnn"者，參數號碼由000~999。)

tt ：回覆參數之資料類型

資料類型tt 資料種類 資料範圍 操作設定器顯示格式

tt=0 可讀寫、記憶 00000~65535 小數點兩位

tt=1 可讀寫、記憶 00000~65535 小數點一位

tt=2 可讀寫、記憶 00000~65535 整數

tt=3 可讀寫、記憶 00000~00255 小數點兩位

tt=4 可讀寫、記憶 00000~00255 小數點一位

tt=5 可讀寫、記憶 00000~00255 整數

tt=6 可讀寫、記憶 00000~00001 整數

tt=7 可讀寫、不記憶 00000~65535 整數

tt=8 僅可讀 00000~65535 小數點兩位，若數值大於 32767，需改為 -(65536-ddddd)

tt=9 僅可讀 00000~65535 小數點兩位

tt=10 僅可讀 00000~65535 小數點一位

tt=11 僅可讀 00000~65535 整數

tt=12 僅可讀 00000~00255 小數點兩位

tt=13 僅可讀 00000~00255 小數點一位

tt=14 僅可讀 00000~00255 整數

tt=15 僅可讀 00000~00001 整數

tt=16 僅可讀 00000~00015 整數，二進制(Binary)

tt=17 僅可讀 00000~00007 整數，二進制(Binary)

tt=18 僅可讀 00000~00003 整數，二進制(Binary)

tt=19 僅可讀 00000~01023 整數

tt=20 僅可讀 0000~FFFF 整數，十六進制(Hex)

tt=22 僅可讀 0000~FFFF 整數，十六進制(Hex)

ddddd ：回覆之參數值(00000~65535)。
s ：回覆驅動器輸出狀態
s = 1 ：驅動器逆轉輸出中
s = 2 ：驅動器正轉輸出中
s = 3 ：驅動器停止
s = 其它值，未定義。
aaaa ：回覆驅動器最近四次故障記錄。(0000~9999)
四個數字分別代表最近四次故障之代碼記錄：
千位數之 a ：代表現在的故障狀況之代碼。
百位數之 a ：代表前一次的故障狀況之代碼。
十位數之 a ：代表前二次的故障狀況之代碼。
個位數之 a ：代表前三次的故障狀況之代碼。

22. RS485 MODBUS(RTU)串列通信說明

Modbus 通信協議為Modicon PLC 廠家所定義的.
完整之資料可以從許多相關網站下載, (如 http://www.gkong.com)
本公司之驅動器僅使用Modbus 之一部份功能, 茲敘述如下:
MODBUS(RTU) protocol in PDS & PDAn series
The RS485 port in PDS & PDAn series can be assigned as MODBUS(RTU) mode.
With this commonly used protocol, user can easily establish a low cost network
between PC/PLC/HMI and our drives.
1. How to configure PDS serial port working in modbus protocol?
Set following parameters:
Parameters Set value Description
Pr.120
=1, JPS Mod bus(RTU)
=3, Standard Modbus(RTU)
Protocol select

Pr.121
=0, 4800bps
=1, 9600bps
=2, 19200bps
=3, 38400bps
Baud rate select

Pr.122
=0, 1 stop bit
=1, 2 stop bit
Stop bit select

Pr.123 ID address 00~99 Address assignment

Pr.124 0 (read only, must <=25 to prevent write data loss) Write Stack Buffer

Pr.125
=0, Even Parity
=1, Odd Parity
=2, No Parity
RTU protocol

Pr.129 elapse time between digit in milli-second

2. How to configure PDAn serial port working in modbus protocol?
Set Pr.93 parameters for RS485 serial port,
Pr.93= 2 B . ID, where
ID: Identification address ranging from 01~99
B=0 4800bps, 2stopbits
B=1 9600bps, 2stopbits
B=2 19200bps, 2stopbits
B=3 reserve
B=4 4800bps, 1stopbits
B=5 9600bps, 1stopbits
B=6 19200bps, 1stopbits
B=7 reserve

3. Protocol summary
Please refer to standard MODBUS protocol definition.
For simplicity, only six basic functions of MODBUS protocol were build.
They are:
MODBUS function code -01(hex): BIT read
MODBUS function code -05(hex): BIT write
MODBUS function code -0f(hex): multiple BIT write
MODBUS function code -03(hex): WORD read
MODBUS function code -06(hex): WORD write
MODBUS function code -03(hex): LONGWORD read
MODBUS function code -10(hex): LONGWORD write

4. Register or Parameter mapping
PDS series
BIT
DI1~DI6 mapping to bit1~bit6
DO1~DO3 mapping to bit17~bit19
WORD
Pr.000~Pr.999 mapping to WORD-000~WORD-999
LONGWORD(even address)
Pr.001/Pr.000 mapping to LONGWORD-000
Pr.003/Pr.002 mapping to LONGWORD-002 ~
Pr.999/Pr.998 mapping to LONGWORD-998
***note: For PDS drive, longword Read/Write function, high word data store in higher register address.
PDAn series
BIT
DI1~DI6 mapping to bit1~bit6
DO1~DO3 mapping to bit17~bit19

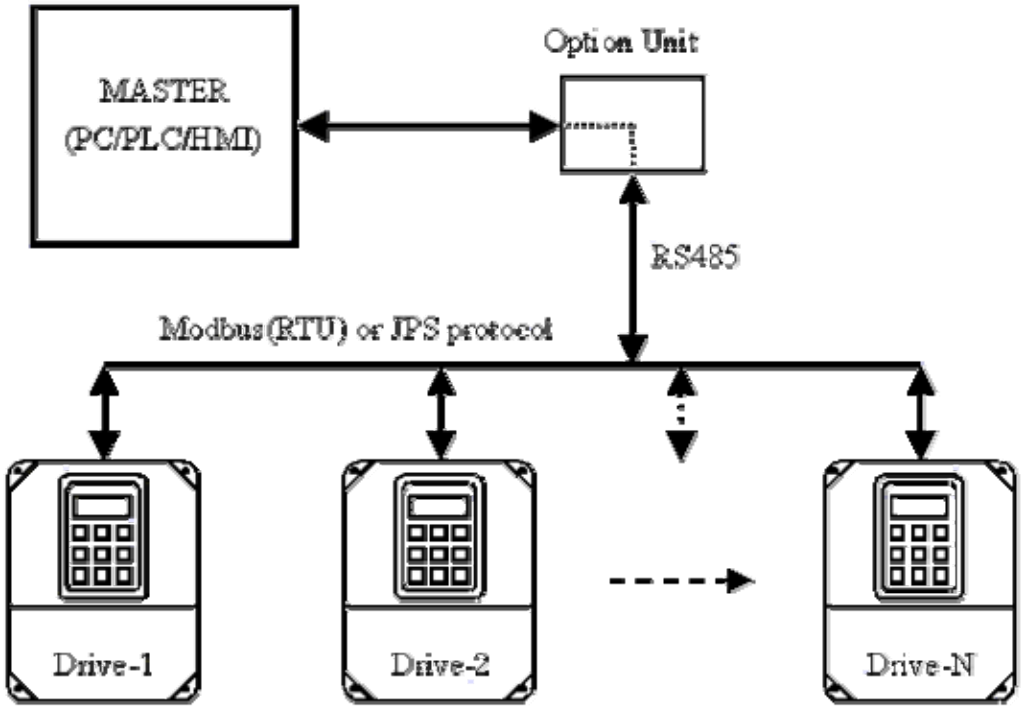
WORD

Pr.00~Pr.99 mapping to WORD-00~WORD-99

LONGWORD

Not used

23. RS485 串列通信__如何以 PLC 或人機介面直接控制變頻器



1. Option Unit is necessary when:
   a. MASTER does not built-in RS485 hardware
   b. MASTER does not support Modbus(RTU) Protocol
2. Maximum Drive N is determined by:
   a. N=99, when master can assign multiple ID address
   b. N=8, when master can assign only 1 ID address(etc. HMI)
3. Only PDS and PDAn series support Modbus(RTU) protocol

.....

How to connect to Easyview-HMI RS485(RS422) port to PDS inverter

D-sub 9pin Male<-->JAM-SC-5P

Pin4←----------→ Sig + Pin3(A)

Pin5←----------→ Sig - Pin4(B)

Pin6←----------→ 0V Pin2(0V)

.....

How to connect to Easyview-HMI RS232 port to JPS(232/485) comm. board

D-sub 9pin Male<-->D-sub 9pin Female

Pin2←----------→ Pin3

Pin3←----------→ Pin2

Pin5←----------→ Pin5(GND)

Pin7←----------→ Pin8

Pin8←----------→ Pin7

How to connect to Proface-HMI RS485 port to PDS inverter

D-sub 25pin Male←--------------------------------------→JAM-SC-5P

Pin4← →Pin5

Pin7--→ 0V Pin2(JAM)

Pin9← →Pin10← →Pin11----------------------------→Sig+ Pin3(JAM)

Pin15← →Pin16--→Sig- Pin4(JAM)

Pin18← →Pin19

Pin21← →Pin22 •

How to connect PC 9-Pin Communication port to PDA/E communication board

PC 9-Pin PDA/E Com. Board

Pin1: N.C.

Pin2: RX to RX

Pin3: TX to TX

Pin4: N.C.

Pin5: 0V to 0V

Pin6: DSR to 9V

Pin7: RTS to RTS

Pin8: CTS to 9V

Pin9: N.C.

....

24. PDS 通信注意事項

1.參數設定請適當選擇 JPS protocol 或 Modbus protocol
2.防止EAROM(EEPROM)過度寫入之方法
若 Pr.186=0, 資料可寫入EAROM 之中, 永久保存.
若令 Pr.186=1, 資料僅寫入工作區之RAM, 而不寫入EAROM 之中.
在關機後(或Reset 後), 必定自動重置Pr.186=0 , 且原先寫入之資料不復存在.
3. 檢查Pr.124, 若Pr.124>25, 則暫停繼續寫入參數
4. Modbus Multiple Read 可讀取連續之8 words
5. Modbus Multiple Write 最多可寫入連續之 2 words(1 long-wrod)

25. PDS 通信注意事項

1. 參數設定請適當選擇 JPS protocol 或 Modbus protocol
2. 防止 EAROM(EEPROM)過度寫入之方法
若 Pr.95=0, 資料可寫入 EAROM 之中.
若 Pr.95=1, 資料完全不可寫入.
若 Pr.95=2, 資料僅寫入工作區之 RAM, 而不寫入 EAROM 之中.
在關機後(或 Reset 後), Pr.95 不變, 且原先寫入之資料不復存在.
要恢復可寫入狀態, 請令 Pr.95=1 再令 Pr.95=0 即可.
3. 檢查 Write_Queue_Content, 先令 PR.55=8, 則 Pr.56 即顯示 Queue 值.
若 Pr.56>25, 則暫停繼續寫入參數
4. Modbus Multiple Read 可讀取連續之 8 words
5. Modbus Multiple Write 不支援

26. 控制相關問題

1 使用 AI1 控制轉速，實際轉速比理論值慢
由於 PDS 的 AI 控制是由輸入最低值為基準
如最低值不是 0 的話，需已設定之數值當基準來進行換算
否則會有換算出來的轉速比實際轉速高的情況發生

換算方式:
AI1(A/D)轉換值為 1 時的速度= Pr.310/ Pr.90
Pr.58=(Pr.201- Pr.89)×AI1(A/D)轉換值為 1 時的速度

Pr.58=輸出轉速
Pr.89= AI1 端子輸入最低值
Pr.90= AI1 端子輸入最高值
Pr.201= AI1(A/D)轉換值 (觀測值)
Pr.310=額定轉速

例:
Pr.58=177
Pr.89=3
Pr.90=1017
Pr.201=93
Pr.310=2000

2000/1017=1.9666
(93-3)×1.9666=176.94

101. Description of the basic parameters of motor?

This drive can store 4 motor parameters and use Pr.188 to select motor parameters group.
This function in checked only when power ON or after reset.
Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
Pr.188 = 1, using the parameters of Group 1 motors (Pr.350 ~ 399).
Pr.188 = 2, using the parameters of Group 2 motors (Pr.400 ~ 449).
Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
generallyt, when using AC induction servo motors, select Pr.188 = 0 use of motor parameters Group 0 (Pr.300 ~ 349).
generaly, when the use of permanent magnet AC servo motor, select Pr.188 = 3 use motor parameters Group 3 (Pr.450 ~ 499).
(In the selected motor group, the no used parameters must set to 0)
Basic motor parameters
Pr.300/350/400/450 Motor Type Select
= 0, Induction motor V/F control
= 1, Induction motor Sensor-Less mode
= 2, Induction motor Servo mode
= 3, Permanent magnet servo motor
Pr.307/357/407/457 motor rated voltage (%)
(motor rated voltage / power supply voltage) * 100%
Pr.308/358/408/458 Motor peak voltage (%)
(Motor Peak Voltage / Line Voltage) * 100%
Pr.309/359/409/459 Boost Voltage (%)
Minimum voltage while output speed is low.
For induction motor V/F mode only.
Pr.310/360/410/460 Motor Rated RPM
Rated speed of motor
Pr.311/361/411/461 Motor rated current (%)
(Motor Rated current / Drive Rated Current) * 100%
Pr.312/362/412/462 Motor Peak Current (%)
(Motor Peak Current / Motor Rated Current) * 100%
Pr.313/363/413/463 Field Current (%)
(Motor Field Current / Motor Rated current) * 100%
For induction motor only.
Pr.314/364/414/464 Pole
Pole number of motor
Pr.315/365/415/465 Maximum RPM
Maximum speed of motor (RPM)
Pr.316/366/416/466 Minimum RPM
Minimum speed of motor (RPM)
Pr.317/367/417/467 Slip RPM
Slip speed of induction motor (RPM)

For iinduction motors only.
Pr.342/392/442/492 BL Motor Select
Brushless Servo Motor type select, normal set to 0. Please consult to our R&D department for details
Parameters of Encoder
Pr.302/352/402/452 Encoder PPR
Pulse per revolution of encoder
Pr.303/353/403/453 A-Lead/Lag-B
Determine encoder feedback direction
Pr.304/354/404/454 AB Filter
Determine sampling period of encoder
Pr.340/390/440/490 Resolver Shift Angle
Defines the shift angle between motor and resolver.
Please consult to our R&D department for details
Pr.341/391/441/491 Resolver Polarity
Defines the polarity of Sine Cosine signal.
Please consult to our R&D department for details.
Parameters for monitor
Pr.301/351/401/451ABC Status
monitoring input status Encoder Counter
Pr.305/355/405/455 AB Counter
Monitors counter value of encoder (Hex form)
Pr.306/356/406/456 UVW Status
Monitors Brushless servo motor UVW status
Pr.318/368/418/468 Encoder PPR Check
Recode PPR of motor, the value is 4*Encoder PPR
Parameters for control function
Pr.330/380/430/480 Position/Speed Select
= 0, the speed control mode
= 1, position control mode
Pr.331/381/431/481 Pcmd/APTP Select
= 0, Auto Point to Point (APTP)
= 1, Pulse Command contro (Pcmd)
Pr.332/382/432/482 Absolute/Increment Select
= 0, Increment Position control for APTP
= 1, Absolute Position control for APTP
Pr.333/383/433/483 Torque Limit Source Select
= 0, No torque limit
= 1, AI1
= 2, AI2
= 3, AI3
= 4, Pr.067 (RAM)
= 5, PID output

= 6, Pr.069 (EAROM)
= 7, analog input AI1 * AI2
Pr.334/384/434/484 Length Conversion
Used in automated point-to-point (APTP) mode
Pr.335/385/435/485 Length Compensation
Used in automated point-to-point (APTP) mode
Pr.336/386/436/486 Compensation Polarity
Used in automated point-to-point (APTP) mode
Pr.343/393/443/493 Direct Torque Control Select
= 0, Stardard Torque Control Mode. This mode only control maximum torque, Torque Limit Source select by Pr.333/383/433/483
= 1, Direct Torque Control Mode.This mode control both Torque and Speed; torque limit source determined by AI1; maximum forward speed determined by Pr.500; maximum reverse speed determined by Pr.502
Pr.344/394/444/494 APTP S Ramp Select
7= 0, no s-ramp
= 1, to select APTP S-curve acceleration/deceleration.
Used in automated point-to-point (APTP) mode
Parameters for PID gain
Pr.319/369/419/469 Reserved for special use, must set to 0 normally.
Pr.320/370/420/470 P gain (Current Loop)
Pr.321/371/421/471 I gain (Current Loop)
Pr.322/372/422/472 Reserved for special use, must set to 0 normally.
Pr.323/373/423/473 P gain (Speed Loop)
Pr.324/374/424/474 I gain (Speed Loop)
Pr.325/375/425/475 Reserved for special use, must set to 0 normally.
Pr.326/376/426/476 P gain (Position Loop)
Pr.327/377/427/477 Rreserved for special use, must set to 0 normally.
Pr.328/378/428/478 Rreserved for special use, must set to 0 normally.
Pr.329/379/429/479 Rreserved for special use, must set to 0 normally.

102. AC induction servo motor basic settings?

Parameters group
first choice of parameters must be set Pr.188 groups.
this drive can store 4 settings motor parameters; in the boot Pr.188 decision by the motor drive parameters using the group.
Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
Pr.188 = 1, using the parameters of Group 1 motors (Pr.350 ~ 399).
Pr.188 = 2, using the parameters of Group 2 motors (Pr.400 ~ 449).
Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
general habit, when using AC induction servo motors, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
the basic characteristics of the electrical parameters Select motor type
Pr.300
= 2, the use of AC induction servo motor
Pr.307 motor rated voltage (%)
(motor rated voltage / power supply voltage) * 100% maximum voltage motor
Pr.308 (%)
(the maximum speed allowed when the motor voltage / supply voltage) * 100% enhance the voltage
Pr.309 torque (%)
V / F mode, torque voltage upgrade
Pr.310 rated motor speed (RPM)
Motor rated speed
Pr.311 motor rated current (%)
(motor rated current / rated current drive) * 100% motor maximum current
Pr.312 (%)
(maximum allowable motor current / motor rated current) * 100%
Pr.313 induction motor excitation current (%)
(motor magnetizing current / motor rated current) * 100% very few
Pr.314 motor (Pole) Very few motor
Pr.315 maximum allowable speed of motor
Maximum allowable motor speed to RPM of
Pr.316 the minimum allowed speed of motor
Motor speed to the minimum allowed RPM of
Pr.317 Induction motor slip speed (RPM)
Induction motor slip speed to the RPM of
Pr.342 the winding direction of permanent magnet motor
= 0, AC induction servo motors do not need to set up. feedback components
relevant parameters
Pr.302 ENCODER pulse number per revolution Encoder settings
of PPR
Pr.303 is leading to B when A or A backward B Encoder feedback
amendment of direction Filter volume

Pr.304 ENCODER Encoder Input Filtering
amended, or sampling time (sampling time)
Pr.340 RESOLVER offset angle
= 0, AC induction servo motors do not need to set up. polarity
Pr.341 RESOLVER
= 0, AC induction servo motors do not need to set up.
observation to monitor the relevant parameters A.B.C. of
Pr.301 ENCODER enter a state of
Monitoring input status Encoder Counter
Pr.305 ENCODER HEX format
to read out the contents of Counter Encoder
Pr.306 ENCODER enter a state of UVW
AC induction servo motor magnetic pole does not need to monitor feedback signals UVW ENCODER measured
Pr.318 pulse number per revolution each rotary motor
records obtained by the detection of pulses, the detection value of Encoder pulses per revolution octave number of 4.
operating mode of the relevant parameters
In accordance with the application of the need to select
gain control characteristics of the relevant parameters
Adjusted depending on the situation of the actual operation
(in the selected group of parameters, other parameters did not use to be set to 0)

103. Permanent magnet AC servo motor basic settings?

Parameters group
first choice of parameters must be set Pr.188 groups.
this drive can store 4 settings motor parameters; in the boot Pr.188 decision by the motor drive parameters using the group.
Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
Pr.188 = 1, using the parameters of Group 1 motors (Pr.350 ~ 399).
Pr.188 = 2, using the parameters of Group 2 motors (Pr.400 ~ 449).
Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
general habit, when the use of permanent magnet AC servo motor, select Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
the basic characteristics of the electrical parameters Select motor type
Pr.450
= 3, the use of permanent magnet brushless AC servo motor
Pr.457 motor rated voltage (%)
(motor rated voltage / power supply voltage) * 100% maximum voltage motor
Pr.458 (%)
(the maximum speed allowed when the motor voltage / supply voltage) * 100% enhance the voltage
Pr.459 torque (%)
= 0, AC brushless permanent magnet servo motors do not need to set up.
Pr.460 rated motor speed (RPM)
Motor rated speed
Pr.461 motor rated current (%)
(motor rated current / rated current drive) * 100% motor maximum current
Pr.462 (%)
(Maximum allowable motor current / motor rated current) * 100%
Pr.463 induction motor excitation current (%)
= 0, AC brushless permanent magnet servo motors do not need to set up. very few
Pr.464 motor (Pole) Very few motor
Pr.465 maximum allowable speed of motor
Maximum allowable motor speed to RPM of
Pr.466 the minimum allowed speed of motor
Motor speed to the minimum allowed RPM of
Pr.467 induction motor slip speed (RPM)
= 0, AC brushless permanent magnet servo motors do not need to set up.
Pr.492 the winding direction of permanent magnet motor
winding in accordance with the direction of the brand choice of production (the application, please contact the company sector). feedback components
relevant parameters
Pr.452 ENCODER pulse number per revolution Encoder settings
of PPR
Pr.453 is leading to B when A or A backward B Encoder feedback

amendment of direction Filter volume
Pr.454 ENCODER Encoder Input Filtering
amended, or sampling time (sampling time)
Pr.490 RESOLVER offset angle Setting motor magnetic North Pole Angle reconciliation marked the point of view of magnetic north offset Different depending on the brand of choice (please contact the Company's Application Service). Polarity Pr.491 RESOLVER Angle solution
set signal polarity
different depending on the brand of choice (please contact the Company's Application Service).
observation to monitor the relevant parameters A.B.C. of
Pr.451 ENCODER enter a state of
Monitoring input status Encoder Counter
Pr.455 ENCODER HEX format
to read out the contents of Counter Encoder
Pr.456 ENCODER enter a state of UVW
monitor pole brushless servo feedback signals UVW
AC permanent magnet servo installation of U, V, W pole Encoder feedback signal can be observed.
ENCODER measured
Pr.468 pulse number per revolution each rotary motor
records obtained by the detection of pulses, the detection value of Encoder pulses per revolution octave number of 4.
operating mode of the relevant parameters
In accordance with the application of the need to select
gain control characteristics of the relevant parameters
Adjusted depending on the situation of the actual operation
(in the selected group of parameters, other parameters did not use to be set to 0)

104. How to perform speed mode?

Parameters group
first choice of parameters must be set Pr.188 groups.
this drive can store 4 settings motor parameters; in the boot Pr.188 decision by the motor drive parameters using the group.
Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
Pr.188 = 1, using the parameters of Group 1 motors (Pr.350 ~ 399).
Pr.188 = 2, using the parameters of Group 2 motors (Pr.400 ~ 449).
Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
general habit, when using AC induction servo motors, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
general habit, when the use of permanent magnet AC servo motor, select Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
this case to AC induction servo motor speed control to enforce the use of, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
the basic characteristics of motor-related parameters and feedback components relevant parameters - please refer to description of the basic parameters of motor
operation mode of the relevant parameters
Pr.330 speed or position control mode selection
= 0, the speed control mode
Pr.331 automatic positioning or tracking mode selection
= 0, the speed control mode, there is no role.
Pr.332 incremental or absolute position mode selection
= 0, the speed control mode, there is no role. source of torque limit
Pr.333 options
= 0, do not use torque (current) limit
Pr.334 The length of the conversion options
= 0, the speed control mode, there is no role.
Pr.335 length compensation
= 0, the speed control mode, there is no role. polarity of the length of the compensation
Pr.336
= 0, the speed control mode, there is no role.
Pr.343 Torque Control Mode Selection
= 0, the standard control mode, choose from Pr.333 source of torque limit
Pr.344 automatic point-to-point (APTP) S curve selection
= 0, the speed control mode, there is no role.
gain control characteristics of the relevant parameters
Pr.319 = 0, reservations
Pr.320 = 50, the proportion of current-loop gain
Pr.321 = 50, the current loop integral gain
Pr.322 = 0, reservations
Pr.323 = 500, the ratio of the speed loop gain

Pr.324 = 50, the speed loop integral gain
Pr.325 = 0, reservations
Pr.326 = 0, the proportion of the location of loop gain, in speed control mode, there is no role.
other basic operation of the relevant parameters (Reference Manual)
Pr.000 = 500, speed of command settings (Rpm)
Pr.001 = 5.00, acceleration time setting (Sec)
Pr.002 = 5.00, deceleration time settings (Sec)
Pr.039 = 0.0, choose a command from the operation panel operation control
Pr.181 = 0, choose the operation panel control panel for operation LOCAL
Pr.040 = 0.00, choose the speed command set by Pr.000
Pr.141 = 102, DI1 (102) is set to Enable input
operational DI1 and
will Dcom short circuit, the motor excitation current that is
of CTL in the control panel mode, press FWD button, the motor that is running to 500Rpm

105. How to perform torque control?

PDS series servo drives can perform two types of torque (torque) control mode:
Mode-0: standard mode, the speed of the torque limit function
Mode-1: direct torque control method
(In this case, assuming Pr.188 = 0, motor parameters chosen Pr.300 ~ Pr.349 please refer to how to implement the speed of model ?)
Mode-0: standard mode, the speed of the torque limit function (Speed Control with Torque Limit)
The Pr.343 = 0, you can boot into this mode automatically.
Speed Pr.040 decided to order from.
If the load torque is less than required for Torque-Limit settings
The operation speed can be achieved with the speed of the same order.
If the load torque is greater than required for Torque-Limit settings
Will reduce the speed of the operation, the same can not compete with the speed of command.
Torque-Limit settings Pr.333 decision by the source, the following options:
0: no restrictions, Torque-Limit can be output to the maximum limit.
(Maximum Pr.312 decision that is the maximum current)
1: by AI1 (choose 0 ~ +5 V or 0 ~ +10 V) input voltage of the decision Torque-Limit.
2: from AI2 (choose 0 ~ +5 V or 0 ~ +10 V) input voltage of the decision Torque-Limit.
3: from AI3 (choose 0 ~ +5 V or 0 ~ 20ma) of the input voltage or current decision Torque-Limit.
4: from Pr.067 decision. 0.00 ~ Pr.067 the scope of 100.00 percent.
(Each time after opening the power or reversion Pr.067 = 0.00)
5: The output from the PID Block (ie, abs (Pr.242)) decision.
6: from Pr.069 decision. Pr.069 the range of 0 ~ 100%.
(V8.97 ~, clearance does not affect the power or reversion Pr.069)
7: by the AI1 * AI2 decision (V9.21 ~). Torque Limit Select
way:
Pr.333 = ab, Pr.333 can be set at the same time two sets of figures a and b. The scope of a = 0 ~ 7, b = 0 ~ 7.
Basically, from a chosen set of Torque-Limit source settings.
However, if there is any input function is set to DIx (108), while
DIx (108) = OFF: from a set of Torque-Limit to select the source settings.
DIx (108) = ON: from b to select the set Torque-Limit source settings.
Mode-1: Direct torque control (Direct Torque Control with Speed Limit)
(V9.07 ~ above, the new additional features)
The Pr.343 = 1, you can boot into this mode automatically.
Torque Command by AI1 (bi-directional input) input
Pr.500 = Forward Speed Limit (the speed limit is being transferred)
Pr.502 = Reverse Speed Limi t (inversion speed limit)
Torque control operation mode switch method
(V9.07 ~ above, the new additional features) If there is any input
function set DIx (208), regardless of the setting Pr.343, Torque control mode
by DIx (208) decision.

DIx(208)=OFF， Mode-0： Speed control with Torque Limit
DIx(208)=ON， Mode-1： Torque control with Speed Limit

106. How to check torque output?

How to check Torque Output in digital form?
Set Pr.589=5, then Pr.599 will show the output torque in Hex form.
How to check Torque Output in analog form?
We can also use analog waveform to verify the torque output, assume AO1 is used as the analog output pin.
1. Select Pr.210=8, then AO1 will show the bi-directional torque output waveform.
2. Select Pr.210=9, then AO1 will show the absolute value of torque output waveform.
Then, observe AO1 while tracking in process.
ex. When AO1 output is +10Volts, means motor generates maximum torque.
Note: All AOx have 10ms time delay.

107. How to perform Pcmd / Tracking mode?

Parameters group
first choice of parameters must be set Pr.188 groups.
this drive can store 4 settings motor parameters; in the boot Pr.188 decision by the motor drive parameters using the group.
Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
Pr.188 = 1, using the parameters of Group 1 motors (Pr.350 ~ 399).
Pr.188 = 2, using the parameters of Group 2 motors (Pr.400 ~ 449).
Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
general habit, when using AC induction servo motors, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
general habit, when the use of permanent magnet AC servo motor, select Pr.188 = 3, the use of Group 3 motor parameters (Pr.450 ~ 499).
this case to AC induction servo motor speed control to enforce the use of, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
the basic characteristics of the electrical parameters and feedback related components please refer to the relevant parameters description of the basic parameters of motor
operation mode of the relevant parameters
Pr.330 speed or position control mode selection
= 1, position control mode
Pr.331 automatic positioning or tracking mode selection
= 1, Pcmd / Tracking tracking mode
Pr.332 incremental or absolute position mode selection
= 0, in the position under the track mode, there is no role. source of torque limit
Pr.333 options
= 0, do not use torque (current) limit Select the length of the conversion
Pr.334
= 0, in the location tracking mode, the non-use.
Pr.335 length compensation
= 0, in the location tracking mode, the non-use. polarity of the length of the compensation
Pr.336
= 0, in the location tracking mode, the non-use.
Pr.343 Torque Control Mode Selection
= 0, in the location tracking mode, the non-use.
Pr.344 automatic point-to-point (APTP) S curve selection
= 0, in the location tracking mode, the non-use.
gain control characteristics of the relevant parameters
Pr.319=0, Reservations
Pr.320 = 50, the proportion of current-loop gain
Pr.321 = 50, the current loop integral gain
Pr.322 = 0, reservations
Pr.323 = 500, the ratio of the speed loop gain

Pr.324 = 50, the speed loop integral gain
Pr.325 = 0, reservations
Pr.326 = 100, the proportion of the location of loop gain, in the position control mode, the adjustment in accordance with the system features.
other basic operation of the relevant parameters (Reference Manual)
Pr.039 = 0.0, choose a command from the operation panel operation control
Pr.181 = 0, choose the operation panel control panel for operation LOCAL
Pr.141 = 102, DI1 (102) is set to Enable input
special parameters of the application (Reference Manual)
Pr.130 can choose from the X / Y input of the pulse signal input type,
= 0, 4 pulse ratio of two-way (Two Phase)
= 1, count pulse (Colck Pulse) and direction signal (Direction)
= 2, the number of pulse (UP-clock) and pulse a few (DOWN-clock)
= 3, 2 pulse ratio of two-way (Two Phase)
Pr.132 can be changed by the X / Y input of the pulse signal input of the direction of
Pr.133 can be changed by the X / Y input of the pulse signal input of the multiplier ratio,
Pr.134 can be changed by the X / Y input of the pulse signal input ratio of the divisor,
operational DI1 and
will Dcom short circuit, the motor excitation current that is
of CTL in the control panel mode, press FWD key, that is, to enter the tracking mode of motor
by the X / Y input signal by adding pulses, the motor that is tracking the implementation of targeted actions.

108. How to check tracking error?

How to check Tracking Error in digital form?

In Tracking mode,

Set Pr.589=3, then Pr.590~Pr.595 are used to check the Position Loop status.

Pr.591/590 : Position Command value(32bits Hex)

Pr.593/592 : Position Feedback value(32bits Hex)

Pr.595/594 : Position Error value(32bits Hex)

Normally, check Pr.594 is well enough.

How to check Tracking Error in analog form?

We can also use analog output to verify the tracking error waveform, assume AO1 is used as the output pin.

1. Select Pr.210=12, then AO1 will show the Position Error waveform while Tracking.

2. Set Pr.570=N, where N is the desired full scale error pulses.

Then, observe AO1 waveform while tracking in process.

ex. When AO1output is +10Volts, means motor position lag N pulses.

Note: All AOx have 10ms time delay.

109. How to perform auto-point-to-point (APTP) mode?

In this case to AC induction servo motor speed control to enforce the use of, select Pr.188 = 0, the use of motor parameters 0 Group (Pr.300 ~ 349).
the basic characteristics of the electrical parameters and feedback related components please refer to the relevant parametersDescription of the basic parameters of motor
Operation mode of the relevant parameters
Pr.330 speed or position control mode selection
= 1, position control mode
Pr.331 automatic positioning or tracking mode selection
= 0, Auto Point To Point mode
Pr.332 incremental or absolute position mode selection
= 0, select Incremental (incremental) operating mode source of torque limit
Pr.333 options
= 0, do not use torque (current) limit Select the length of the conversion
Pr.334
= 1, choose the length of automatic conversion, automatic conversion setting a head (DL16 -> DL0)
Pr.335 length compensation
= 0, this case does not use. polarity of the length of the compensation
Pr.336
= 0, this case does not use.
Pr.343 Torque Control Mode Selection
= 0, in the location tracking mode, the non-use.
Pr.344 automatic point-to-point (APTP) S curve selection
= 1, the use of smooth S curve acceleration and deceleration
gain control characteristics of the relevant parameters
Pr.319 = 0, reservations
Pr.320 = 50, the proportion of current-loop gain
Pr.321 = 50, the current loop integral gain
Pr.322 = 0, reservations
Pr.323=500, Ratio of the speed loop gain
Pr.324 = 50, the speed loop integral gain
Pr.325 = 0, reservations
Pr.326 = 100, the proportion of the location of loop gain, in the position control mode, the adjustment in accordance with the system features.
other basic operation of the relevant parameters (Reference Manual)
Pr.039 = 1.0, choose a command from the operation panel operation control
Pr.040 = 0.0, choose the speed control command from Pr.000
Pr.000 = 500, choose the speed of command = 500rpm
Pr.001 = 0.50, options to speed up time = 0.50 seconds
Pr.002 = 0.50, deceleration time selection = 0.50 seconds
Pr.141 = 100, DI1 (100) is set to Enable & RUN standby input
specific parameters related to the application (Reference Manual)

Pr.577/576 = um / revolution, defined as the motor of the feed per revolution length
Pr.533/532 = xxxxxxxx (um), the default length of feed
the application of the relevant special I / O functions (see Manual)
DIx (118) = Trigger Start trigger input, the servo started to fixed-length
DOx (124) = Servo End output terminal, said the end of fixed-length servo
standard control wiring diagram
Operational
to DI1 (100) and Dcom short-circuit, the motor excitation current, that is, waiting for DI4 (118) trigger signal
by DI4 (118) joined the trigger input signal, the motor that is fixed-length implementation of automatic feeding action.
when DO2 (124) = ON, said the end of fixed-length servo; and continue to wait for the next DI4 (118) trigger signal
standard curve run

110. How to check Encoder signals?

First Pr.100 = 64 PG manually check
of PPR

- map from Z, we can see each point of the signal when the number of CPU will Pr.305 into Pr.101

Therefore

- rotating motor Pr.101 will change once a week
- observation Pr.101 difference between the two changes that the motor can rotate week by the total number of pulses
- the internal use of 4 as a result of CPU frequency circuit, the PG of the actual total PPR = pulses / 4

Pr.101 of

- attention of 16 hexadecimal 0x0000 ~ 0xffff
- For example; Followed by the first

■ value = 0x1234, the second followed by the value of 0x2234
■ difference = 0x2234-0x1234 = 0x1000 = 4096 (decimal)
■ PPR = 4096 / 4 = 1024, this figure in Pr.302

- V9.33 ~ beyond Pr.318 can determine the version of PG manually check

point the width of the Z

- first is to switch the direction of rotation of the number of records Pr.101
- again to reverse the direction of rotation of the number of records Pr.101
- two records in accordance with the difference that the Z points can cover a number of pulse width
- For example;

■ is of value to = 0x1234, inversion of the value of 0x1238
■ difference = 0x1238-0x1234 = 0x0004 = 4 (decimal)
■ point Z that the four pulse width covers

- V9.33 ~ beyond Pr.318 can determine the version of

How to determine whether PG-noise interference by outsiders? Based on the above we can see
note: As long as
At the same Pr.318 to check whether the operation is always a fixed value can be judged

111. Simple method to observe the situation of communication

How to check receive buffer?

Set Pr.589=10, then Pr.590~Pr.599 show the receiving bytes from RS485 serial port.

Pr.590=RX[0]

Pr.591=RX[1]

Pr.592=RX[2]

Pr.593=RX[3]

Pr.594=RX[4]

Pr.595=RX[5]

Pr.596=RX[6]

Pr.597=RX[7]

Pr.598=RX[8]

Pr.599=RX[9], only 10 bytes can be verified

How to check transmit buffer?

Set Pr.589=11, then Pr.590~Pr.599 show the data bytes transmit to RS485 serial port.

Pr.590=TX[0]

Pr.591=TX[1]

Pr.592=TX[2]

Pr.593=TX[3]

Pr.594=TX[4]

Pr.595=TX[5]

Pr.596=TX[6]

Pr.597=TX[7]

Pr.598=TX[8]

Pr.599=TX[9], only 10 bytes can be verified

How to check queue status when writing parameters into the PDS drive?

Any parameter write to the PDS drive is temporary stored into a queue buffer(size=30).

Pr.124 shows the status of the queue content.

If Pr.124=0, means the queue is empty.

If Pr.124=n, means the queue has n parameters waiting transfer to EEPROM(EAROM)

Before sending Parameter Write Command, must always check Pr.124 and guarantee its value is less than 25 .

112. How to make fully synchronized operation of two motors (Digital Lock)?

PDS Series has a number of synchronization (Digital Lock) drive as a standard feature.
(Please refer to: How to track the implementation of position (Pcmd / Tracking) mode?)
Very easy to use, as follows:
As long as the host (M1) of PG-Out signal (Buffer has been included) sent from the machine (M2) as input Pcmd.
Can also change the track by the ratio of Pr.133/Pr.134. (Please refer to Manual)

113. Radius Measurement?

Radius Measurement Block, with Power-Loss backup (V8.92~)
Pr.260 Radius_select
=0 No radius process
=1 Use analog input from AI1 as Radius value
=2 Use analog input from AI2 as Radius value
=3 Use analog input from AI3 as Radius value
=4 Calculate XY/AB clock ratio as Radius value(use Pr.135/Pr.136 as Gear Ratio)
=5
Use Winding TURNS pulse input to DIx(190) to increase Radius value
For each DIx(190) trigger input, add 1 to WIND_TURNS(Pr.273/272) data
Radius = Radius_Min + TURNS*thickness
DIx(192)=Preload Radius_Min into Radius_Output, and TURNS=0
=6
Use UnWinding TURNS pulse input to DIx(190) to decrease Radius value
For each DIx(190) trigger input, subtract 1 to WIND_TURNS data
Radius = Radius_Max - TURNS*thickness
DIx(191)=Preload Radius_Max into Radius_Output, and TURNS=0
=7 AI1 as Line speed input
=8 AI2 as Line Speed input
=9 AI3 as Line Speed input
Pr.261 Thickness or Minimum Threshold speed
when Pr.260=5 or 6 Pr.261=Thickness(0~999.9um) of each turn
when Pr.260=4 Pr.261=Minimum Speed(0~999.9RPM) for valid calculation
Pr.263/262 PulsePerMeter or mmPerMinute
when Pr.260=4 used as XY_MeasureRoll_PPM, 0~99999999(PulsesPerMeter)
when Pr.260=7/8/9 used as Maximum-Line-Speed , 0~99999999(mm/Min)
Pr.265/264 Radius_Max, 0~9999999.9(mm)
Pr.267/266 Radius_Min, 0~9999999.9(mm)
Pr.269/268 Radius_BackUp, 0~9999999.9(mm)
Pr.271/270 Radius_Actual, 0~9999999.9(mm) RAM area(within Max and Min)
Pr.273/272 WIND_TURNS, 0~99999999(Turns) RAM area
Pr.274 Radius_OUTPUT(HEX)
Aux.
Functions
Function Description
DIx(190) per described in Pr.260
DIx(191) per described in Pr.260
DIx(192) per described in Pr.260
DIx(193) When selected DIx(193)=ON(trigger), execute Radius_Backup
DIx(194) When selected DIx(194)=OFF(trigger), execute Radius_Backup
AOx(10)

Analog RADIUS output, when AOx(10)=+10V, means
r=100%=RADIUSmax

114. PDS Additional Function for TRACKING-mode

A. Standard Tracking function

For standard Pulse Command tracking function, these parameters was set

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=0, Normal Tracking mode

(Before V9.70 or When not assign any DIx(66))

In this mode, the tracking error is controlled at any instant.

However, the master speed input source must deal with the acceleration/deceleration time.

Else, if the master speed input clock is suddenly asserted,

the slave motor tracking speed will cause transient overshoot as the figure shown below.

To avoid this phenomenon, additional two new tracking function is added after V9.70~.

B. Tracking function with Soft-Clutch (V9.70~)

Similar to the standard Pulse Command tracking function, these parameters was set

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=0.00(sec), Normal Tracking mode

Assign one DI as DIx(66)=Soft-Clutch function

Assign one DO as DOx(66)=Clutch Status output

This function can be referred as Soft-Clutch function.

Assume the Master motor is continuously running at high speed,

a mechanical Hard-Clutch can bring up the slave speed with inevitable machine shock.

For avoiding this machine shock, the Soft-Clutch function is designed

in order to bring the slave speed up smoothly using the pre-determined time assigned in Pr.001.

When the Clutch is totally engaged, an output function DOx(66) can be used to indicate the Clutch status.

In the same manner, when the Soft Clutch is OFF, the slave speed is also decreased smoothly by the time assigned in Pr.001.

*Note: no matter what is the master speed input, the Clutch Engage/Degage time is always fixed to Pr.001.

C. Tracking function with Random Clock Input (V9.70~)

This mode is suitable when master clock pulse in randomly input to the slave.

The slave will track to the master speed and add acc and dec time automatically.

After the master stop sneding clocks, the slave will also stop and LOCK at the exect position as requested.

Pr.330/380/430/480=1, Position mode

Pr.331/381/431/481=1, Tracking mode

Pr.329/379/429/479=x.xx(sec), Ramp Tracking Acc/Dec time

Assign one DI as DIx(104)=Clock-Enable function

Under this selection (when Ramp Tracking Time>0),

The slave tracking response for random clock input is shown in the following diagram.

If DIx(104) is ON, the output speed curve will ramp up/down using the constant defined in Pr.329/379/429/479

Note in this mode, the Soft-CLUTCH function is atomatically disabled.

115. DIx (n) and DOx (n) meaning?

We developed the series of drives, are "planning to drive" (Programmable Drive)
such as PDA: full name Programmable Drive, A-series
PDS: full name Programmable Drive, S-series
each digital input (Digital Input) and digital output (Digital Output) terminal,
can meet the needs of users in accordance with the functions of the many planning options.
DIx (n) the meaning is: first x months designated DI, from the input option selected the first n functions.
DOx (n) the meaning is: first x months specified DO, from the output function options to select the first n functions.
In the above chart, including the timer (TIMER) box features were included in the application of DI1 (7) and DO2 (14)
DI1 (7) that - DI1 input function is set to 7 (= timer input)
DO2 (14) said - the output terminal DO2 function is set to 14 (= timer output)
(choice of menu bar, please refer to the specification of the models)

116. DI / DO with a PLC, can choose Japanese (NPN) or the European Department (PNP) of the PLC?

PD series can only use the Japanese input-output interface NPN.
PDS / PDA / PDAn / PDH series, can choose to use on Jumper Japanese (NPN) or the European Department of the output into the interface. In the above chart, Japanese
selection (NPN) when, JP4/JP5 at the bottom, select TYPE1
selection of the European Department (PNP) when, JP4/JP5 at the top, select the TYPE2

117. How to use Timer (Timer) ?

PDx series of all drivers, both containing box timer (TIMER) the following diagram
There are three basic operating modes: Open-style
delay (Delay-OFF)
Closed delay (Delay_ON)
opening and closing cycle (Auto ON / OFF) Open-style
delay (Delay-OFF)
As indicated in Fig input TMIA (= DIx (7)) to ON, the output TMOA (= DOx (14)) immediately ON.
Input TMIA from ON into OFF, the output TMOA after the time set by Pr.71 after OFF. Closed
delay (Delay_ON)
As indicated in Fig input TMIB (= DIx (11)) to ON, the output TMOB (= DOx (20)) after the time set by Pr.71 after ON.
Input TMIB from ON into OFF, the output TMOB immediately OFF.
opening and closing cycle (Auto ON / OFF)
As indicated in Fig input TMIC (= DIx (36)) for the ON time,
output TMOC (= DOx (42)) and / TMOC (= DOx (43)) automatically generate ON-OFF action (Duty-Cycle = 50 %, Total time = Pr.71)

118. How to use Electronic Rheostat?

PDx series of all drives, all containing the electronic governor (Electronic Rheostat) the following diagram
Only digital input DIx action, you can control the output speed.
Increase or decrease the frequency of change can also be written back to memory.
can also power memory ...., please read the prospectus

119. Automatic control cooling fan?

In order to extend the life of the fan in the drive's heat sink temperature does not exceed 45 ℃, they can stop running.
The following models can have a cooling fan automatic control of the function or stop functioning.
PDS / PDH / PDA / PDAn
of the actual heat sink temperature can be observed Pr.62.

120. How of Communications capability various models ?

Various models of communication as follows：
PDA/H Series
Can additional communication interface RS485/
RS232
Support JPS protocol
Rate:4800bps,9600bps,19200bps
PDAn Series
Includes communication interface RS485
Support JPS protocol,Modbus(RTU)
Rate:4800bps,9600bps,19200bps
PDS Series
Includes communication interface RS485
Support JPS protocol,Modbus(RTU)
Rate: 4800bps,9600bps,19200bps,38400bps
Option：Profibus-DP
IRIS Series
Includes communication interface RS485
Support Modbus(RTU)
Rate: 19200bps

121. JPS protocol

Via the RS485 interface and driver communication between the ASCII string which are,
at the end of CR need to add symbols (0x0d).
computer must be set to port: 7 Bit data, Even Parity PC-to-drive
There are three command format:
1. Operational control commands (no need to reply to drive information)
2. Parameter write command (no response data drive)
3. Parameter read command (drive will respond to parameter values and operating conditions)
Only drive on the computer a command format: Reply
Parameter values and operating status
Operation of control orders
Command format【C， uu ， cc ， fffff 】
C: the initial operation control command characters.
uu: Unit address, from 00 to 99.
if uu = 00, then drive all must accept the order.
cc: the metric system operation control command code (00 ~ 15). Composed of four binary signals, the
cc = 8 * Bit-3 (actin-inch) + 4 * Bit-2 (reverse) + 2 * Bit-1 (is to) + Bit-0 (revert)
fffff: speed settings. cc function
control code
cc = 00 to stop
cc = 01 reversion
cc = 02 are running
cc = 06 reverse operation
cc = 10-inch action is to
cc = 14-inch dynamic reversal
written order parameters
Command format 【W, uu, nn, ddddd】 or 【W, uu, nnn, ddddd】
W: write an order parameter of the initial characters.
uu: Unit address, from 00 to 99.
if uu = 00, then drive all must accept the order.
nn: in accordance with other models, the parameters for the two-digit number "nn", the parameter number from 00 to 99.
(or nnn: according to other models, the parameters for the three-digit number "nnn", the parameter number by 000 ~ 999.)
ddddd: To write the parameter value, from 00000 ~ 65535.
Parameter read command
Command format 【R， uu ， nn 】或 【R， uu ， nnn 】
R: Parameters of the start command to read characters.
uu: Unit address, from 00 to 99.
if uu = 00, then drive all must accept the order.
nn: in accordance with other models, the parameters for the two-digit number "nn", the parameter

number from 00 to 99.
(or nnn: according to other models, the parameters for the three-digit number "nnn", the parameter number by 000 ~ 999.)
Reply computer drive message
Received a request in the drive to read the parameters of command, immediately began to respond to the parameters and information at the time of operation.
reply message format 【P, uu, nn, tt, ddddd, s, aaaa】 or 【P, uu, nnn, tt, ddddd, s, aaaa】
P: parameters of the initial reply to the message characters.
uu: that this string uu Taiwan for the first reply to the message.
by Pr.093 drive parameters of the communications to determine their own address.
nn: in accordance with other models, the parameters for the two-digit number "nn", the parameter number from 00 to 99.
(or nnn: according to other models, the parameters for the three-digit number "nnn", the parameter number by 000 ~ 999.)
tt: reply parameter data type tt information
data type operation set the scope of the types of information display format
tt = 0 can read and write, memory 00000 ~ 65535 decimal point two
tt = 1 can read and write, memory, a decimal point 00000 ~ 65535
tt = 2 can read and write, memory integer 00000 ~ 65535
tt = 3 can read and write, memory 00255 decimal 00000 ~ 2
tt = 4 can read and write, memory, a decimal point 00000 ~ 00255
tt = 5 can read and write, memory integer 00000 ~ 00255
tt = 6 can read and write, memory integer 00000 ~ 00001
tt = 7 can read and write, not memory integer 00000 ~ 65535
tt = 8-readable 00000 ~ 65535 only two decimal places, if the value is greater than 32,767, to be replaced - (65536-ddddd)
tt = 9 only readable two decimal 00000 ~ 65535
tt = 10 only readable one decimal 00000 ~ 65535
tt = 11 only readable integer 00000 ~ 65535
tt = 12 readable only two decimal 00000 ~ 00255
tt = 13 only readable one decimal 00000 ~ 00255
tt = 14 only readable integer 00000 ~ 00255
tt = 15 only readable integer 00000 ~ 00001
tt = 16 only readable 00000 ~ 00015 integers, binary (Binary)
tt = 17 only readable 00000 ~ 00007 integers, binary (Binary)
tt = 18 only readable 00000 ~ 00003 integers, binary (Binary)
tt = 19 only readable integer 00000 ~ 01023
tt = 20 only 0000 ~ FFFF-readable integer, hexadecimal (Hex)
tt = 22 only 0000 ~ FFFF-readable integer, hexadecimal (Hex)
ddddd: reply to the parameter values (00000 ~ 65535).
s: reply to drive the output state
s = 1: reverse the output drive

s = 2: is the drive to output
s = 3: the drive to stop
s = other value, undefined.
aaaa: reply to the recent drive fault record four times. (0000 ~ 9999)
four figures representing the four most recent record of failure of the code: median
1000 a: The representative of the current state of the fault code.
hundred of a: on behalf of the previous code of the fault condition.
median 10 a: the representative of the situation before the War of the fault code.
a median of a: on behalf of the three previous conditions of the fault code.

122. Modbus

Modbus to Modicon PLC communication protocol defined by the manufacturers.
integrity of information can be downloaded from a number of related sites, (such as http://www.gkong.com)
drive the company to use only part of Modbus function, it is described as follows:
MODBUS(RTU) protocol in PDS & PDAn series
The RS485 port in PDS & PDAn series can be assigned as MODBUS(RTU) mode.
With this commonly used protocol, user can easily establish a low cost network between PC/PLC/HMI and our drives.
1. How to configure PDS serial port working in modbus protocol?
Set following parameters:

Parameters	Set value	Description
Pr.120	=1, JPS Modbus(RTU) =3, Standard Modbus(RTU)	Protocol select
Pr.121	=0, 4800bps =1, 9600bps =2, 19200bps =3, 38400bps	Baud rate select
Pr.122	=0, 1 stop bit =1, 2 stop bit	stop bit select
Pr.123	ID address 00~99	Address Assignment
Pr.124	0 (read only, must <=25 to prevent write data loss)	Write Stack Buffer
Pr.125	=0, Even Parity =1, Odd Parity =2, No Parity	RTU protocal
Pr.129	elapse time between digit	in milli-second

2. How to configure PDAn serial port working in modbus protocol?
Set Pr.93 parameters for RS485 serial port,
Pr.93= 2 B . ID, where
ID: Identification address ranging from 01~99
B=0 4800bps, 2stopbits
B=1 9600bps, 2stopbits
B=2 19200bps, 2stopbits
B=3 reserve
B=4 4800bps, 1stopbits
B=5 9600bps, 1stopbits
B=6 19200bps, 1stopbits
B=7 reserve

3. Protocol summary:
Please refer to standard MODBUS protocol definition.
For simplicity, only six basic functions of MODBUS protocol were build.
They are:
MODBUS function code -01(hex): BIT read
MODBUS function code -05(hex): BIT write
MODBUS function code -0f(hex): multiple BIT write
MODBUS function code -03(hex): WORD read
MODBUS function code -06(hex): WORD write
MODBUS function code -03(hex): LONGWORD read
MODBUS function code -10(hex): LONGWORD write

4. Register or Parameter mapping
PDS series
BIT
DI1~DI6 mapping to bit1~bit6
DO1~DO3 mapping to bit17~bit19
WORD
Pr.000~Pr.999 mapping to WORD-000~WORD-999
LONGWORD(even address)
Pr.001/Pr.000 mapping to LONGWORD-000
Pr.003/Pr.002 mapping to LONGWORD-002~
Pr.999/Pr.998 mapping to LONGWORD-998
***note:For PDS drive, longword Read/Write function, high word data store in higher register address.
PDAn series
BIT
DI1~DI6 mapping to bit1~bit6

DO1~DO3 mapping to bit17~bit19
WORD
Pr.00~Pr.99 mapping to WORD-00~WORD-99
LONGWORD
Not used

123. How to use PLC or HMI control drive ?

How to connect to Easyview-HMI RS485(RS422) port to PDS inverter

D-sub 9pin Male<-->JAM-SC-5P

Pin4←--------------------→ Sig + Pin3(A)

Pin5←--------------------→ Sig - Pin4(B)

Pin6←--------------------→ 0V Pin2(0V)

....

How to connect to Easyview-HMI RS232 port to JPS(232/485) comm. board

D-sub 9pin Male<-->D-sub 9pin Female

Pin2←--------------------→ Pin3

Pin3←--------------------→ Pin2

Pin5←--------------------→ Pin5(GND)

Pin7←--------------------→ Pin8

Pin8←--------------------→ Pin7

....

How to connect to Proface-HMI RS485 port to PDS inverter

D-sub 25pin Male←-------------------------------------→JAM-SC-5P

Pin4← →Pin5

Pin7---→ 0V Pin2(JAM)

Pin9← →Pin10← →Pin11--------------------------→Sig+ Pin3(JAM)

Pin15← →Pin16-------------------------------------→Sig- Pin4(JAM)

Pin18← →Pin19

Pin21← →Pin22 •

How to connect PC 9-Pin Communication port to PDA/E communication board

PC 9-Pin PDA/E Com. Board

Pin1: N.C.

Pin2: RX to RX

Pin3: TX to TX

Pin4: N.C.

Pin5: 0V to 0V

Pin6: DSR to 9V

Pin7: RTS to RTS

Pin8: CTS to 9V

Pin9: N.C.

124. PDS Communication Control Notes

Parameter settings, please select the appropriate JPS protocol or Modbus protocol
2. To prevent EAROM (EEPROM) of the method over-write
if Pr.186 = 0, data can be written EAROM, and permanent preservation.
if the Pr.186 = 1, data is only written into the working area of RAM, instead of writing EAROM.
after the shutdown (or after Reset) will automatically reset Pr.186 = 0, and write information on the original no longer exists.
3. check Pr.124, if Pr.124> 25, will be closed to continue to write parameters
4. Modbus Multiple Read to read a row of 8 words
5. Modbus Multiple Write a maximum of 2 consecutive write words(1 long-wrod)

125. PDAn Communication Control Notes

1. Parameter settings, please select the appropriate JPS protocol or Modbus protocol
2. to prevent EAROM (EEPROM) of the method over-write
If Pr.95 = 0, data can be written in EAROM.
If Pr.95 = 1, the information can not be written completely.
If Pr.95 = 2, data is only written into the working area of RAM, instead of writing EAROM.
after the shutdown (or Reset after), Pr.95 unchanged, and the original data no longer write.
to restore the state to write, please make the Pr.95 = 1 and then to Pr.95 = 0.
3. check Write_Queue_Content, shillings PR.55 = 8, the Pr.56 value indicates Queue.
if Pr.56> 25, will be closed to continue to write parameters
4. Modbus Multiple Read to read a row of 8 words
5. Modbus Multiple Write does not support

126. Control related issues

Use the AI1 control speed, actual speed is slower than the theoretical value
Since the PDS AI control input value basis
If the minimum value is not 0, then, need to set the value when the reference to be converted
Otherwise, there will be translated out of speed than the actual speed
Conversion method:
AI1(A/D) Converting value of 1 , V= Pr.310/ Pr.90
Pr.58=(Pr.201- Pr.89)×AI1(A/D) Converting value of 1

Pr.58= Output speed
Pr.89= AI1 input min.
Pr.90= AI1 input min.
Pr.201= AI1(A/D) Conversion value (observation)
Pr.310= Rated speed

ex:
Pr.58=177
Pr.89=3
Pr.90=1017
Pr.201=93
Pr.310=2000

2000/1017=1.9666
(93-3)×1.9666=176.94

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