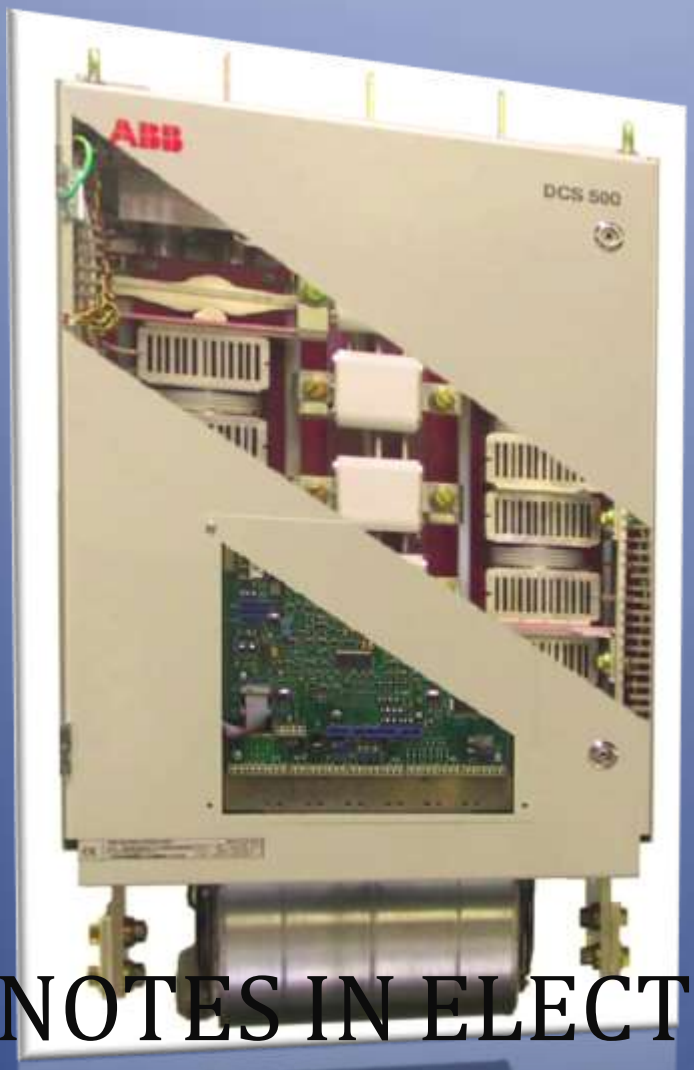


NOTES IN ELECTRICAL SCIENCES 2

ENG.\ AHMED TOGHIAN
EGYPTIAN STEEL

In the first we explain about the concept of DC drive and the power electronic then we explain in brief about DCS 500 of ABB drive because it's very sample and as start in the drives and we will explain the new types of drive of ABB and SIEMENS

مقدمة

الحمد لله رب العالمين و الصلاة والسلام على أفضل المرسلين سيدنا محمد صلى الله عليه وسلم، أقول لكل من يقرا هذا العمل الذي أسال الله أن يجعله فى ميزان حسناتى وكل أمة النبي محمد، أننى اجتهدت فى هذا العمل فى أصعب لحظات حياتى حيث أصبت بوعكة صحية شديدة أسالكم الدعاء.

أقول لكم أبدا الأن فى تتطوير ذاتك فلا تأخر من بدأ، أبدا من الأن مهما كان سنك أعشق عملك أعشق الكهرباء وأبحث عنها كم تبحث عن الحب الرزق رفهية الحياة حتى تبدع فى عملك ، لا تقف عند تقيم أحد لك مهما كن قيمته عليك أن تتؤمن بنفسك وتنطلق من هذا و تستعن بالله وتتوكل عليه وتترك عملك الذي سيظهر ان يتكلم عنك.

لاتيأس فاليأس للكفرين أنطلق من أيمانك بربك و أيمانك بنفسك بشجاعة واقدام وابذل الجهد والعرق الذي سيصنع من يتحدث عنك وعن مجدك.

مهندس/ أحمد تغيان

حديد المصريين

٢٠١٥/٦/١

بسم الله الرحمن الرحيم

Drives

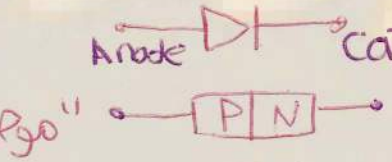
Power Electronic

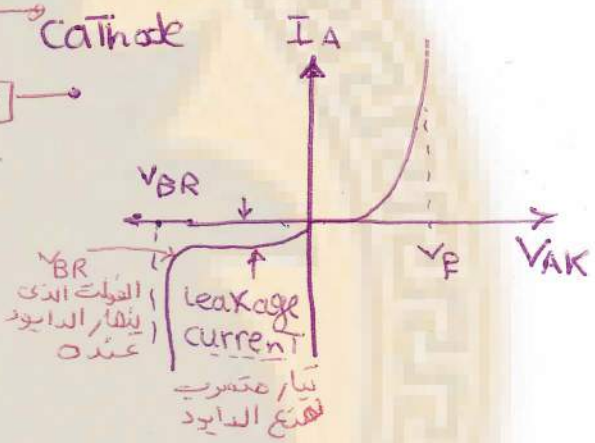
الكترونيات القوى
ذات قدرة كهربية عالية

Diode

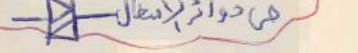
دايود

* Key "يعمل كمفتاح"
* Convert ac to DC "موحد"
* Free wheeling "لمنع التيارات العكسية"





ملحوظة
يوجد ما يعرف بالدياك DIAC
وهو عبارة عن اتنين Diode ومستخدم
فى دوائر الاشعال

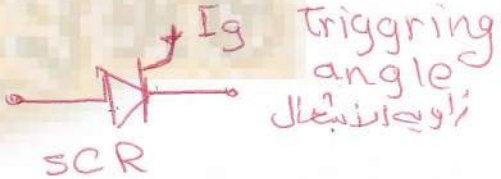


Ziner

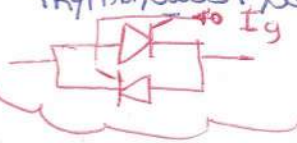
* as Diode but work in the breaking area
هو كدايود يعمل فى منطقة الانهيار

Thyristor

* عبارة عن بوابة (كالدايود) لكنه يعمل عند وصول اشارة الاشعال للبوابة



ملحوظة
يوجد ما يعرف بالتارياك Triac
وهو عبارة عن اتنين Thyristor



Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

DC Drives

DC → DC "chopper" "الرفع وخفض الفولت"

AC → DC "converter" "rectifier"

AC Drives

AC → AC "cyclo converter"

DC → AC "inverter"

rectifier circuit "converter"

half wave

uncontrolled

يعمل على نصف الموجة الموجبة كاملاً دون تحكم في البدء

1Φ

AC

220

DC

220

* يستخدم الـ Diode في هذه الدائرة

controlled

يعمل على نصف الموجة الموجبة مع التحكم في البدء

زاوية الإشعال Trigging angle

* يستخدم الـ Thyristor في هذه الدائرة ويتحكم اشارة الإشعال ليبدء العمل

full wave

uncontroiled

يعمل على الموجة كاملة (+ا ، -ا) دون التحكم في البدء

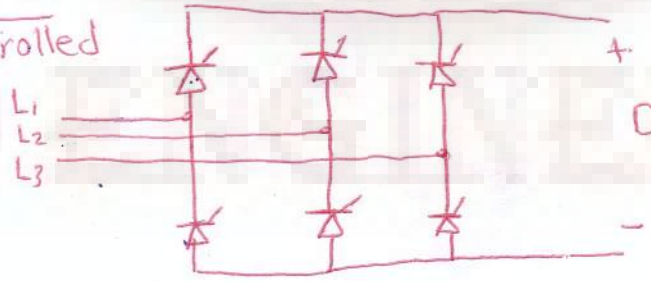
controlled

يعمل على الموجة كاملة مع التحكم في البدء عند طريقة أو زاوية إشعال

التحكم في السرعة عند طريقة خفض الفولت

3Φ converter

full wave controlled

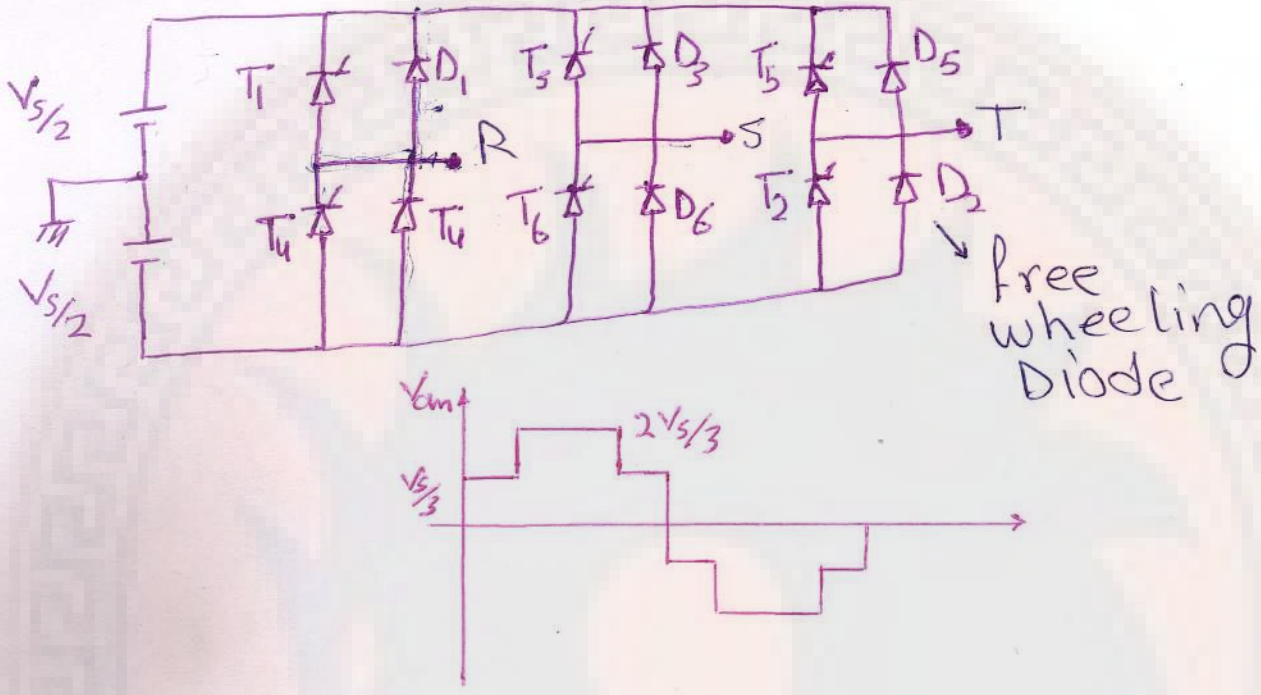


2-Q

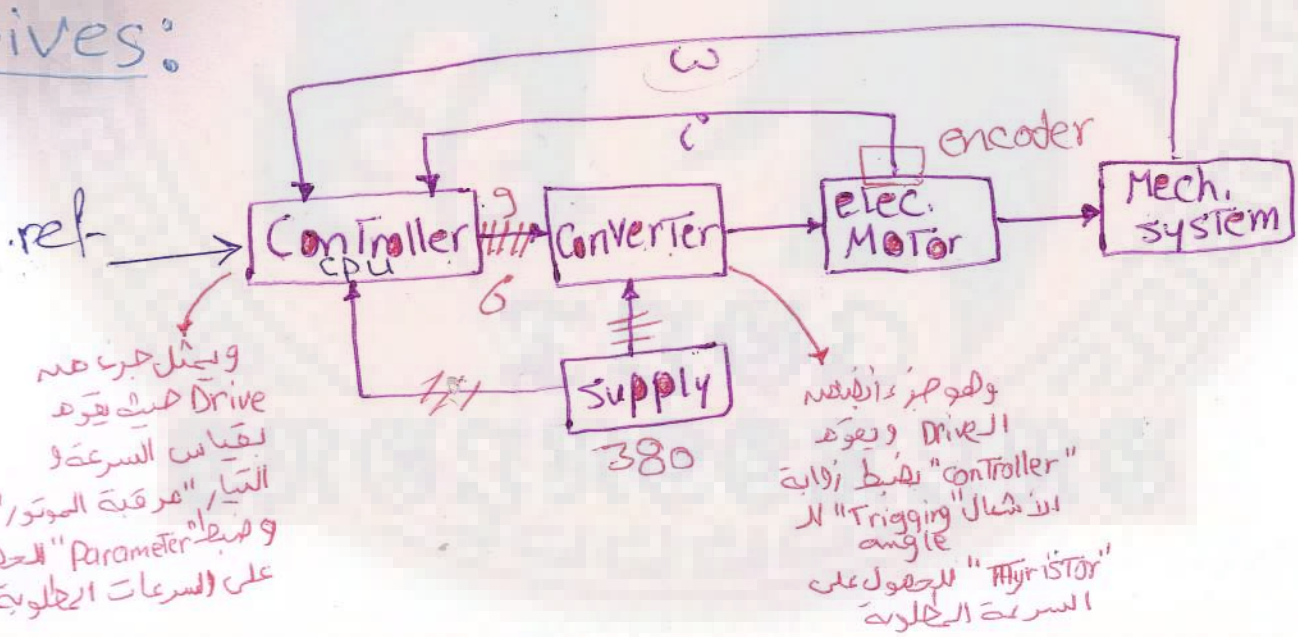
Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

3Φ bridge inverter

يحول منه DC إلى AC ويتحكم في الفولت الخارج



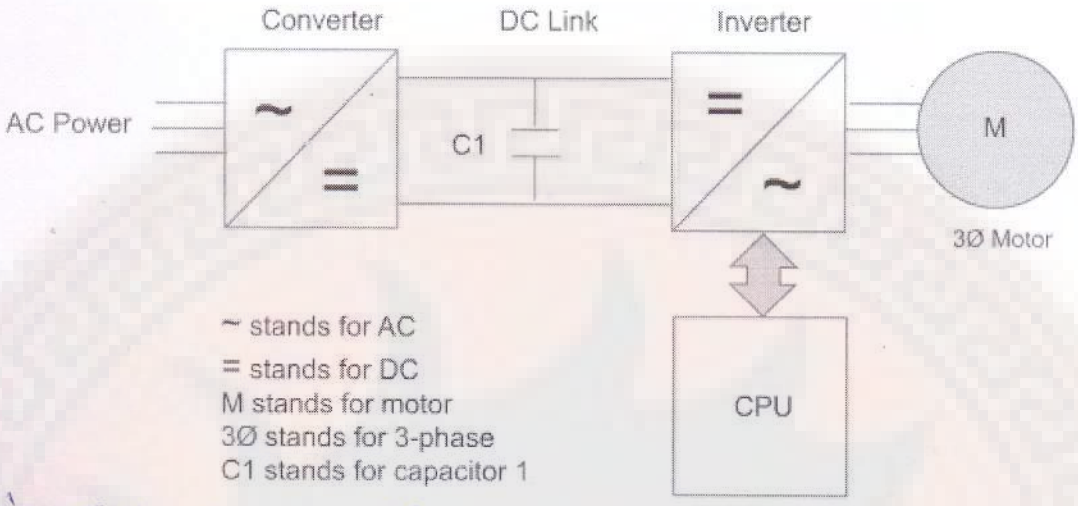
DC Drives:



لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

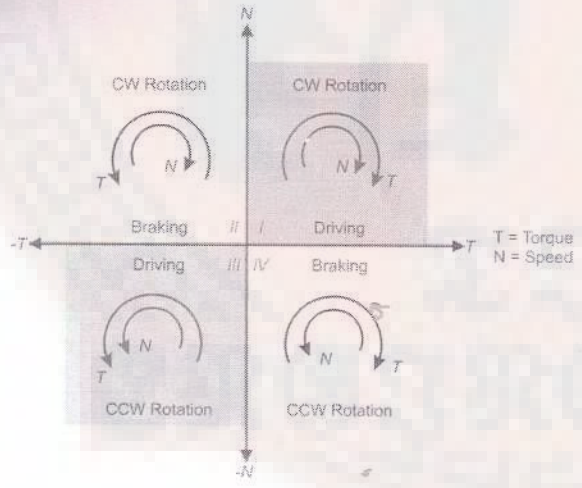
لا إله
(4)
إلا الله

AC Drives



الـ Converter يقوم بالتحويل من AC ← DC للتحكم به عن طريق الـ Inverter الذي يتكون من Thyristor الـ Pulse عن طريق CPU

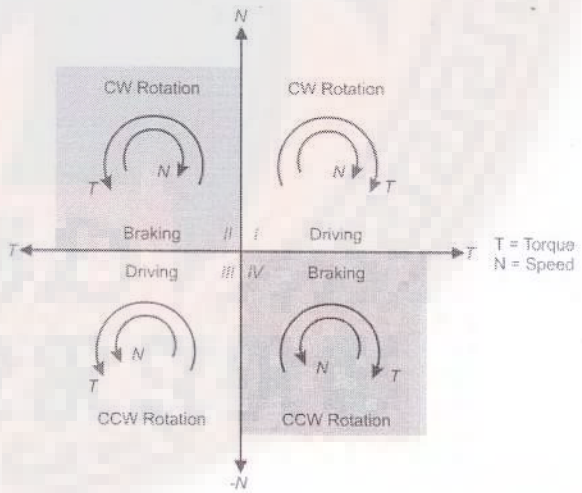
Single-Quadrant Operation



1Q أو 2Q

يقوم الـ Drive بعمل الحركة وعكسها فقط ويحتوي على Thyristor ← 6

Four-Quadrant Operation



4Q

يقوم بالحركة وعكسها وعمل دائرة في الاتجاهين

ويحتوي على Thyristor ← 8

أو TriaC ← 6

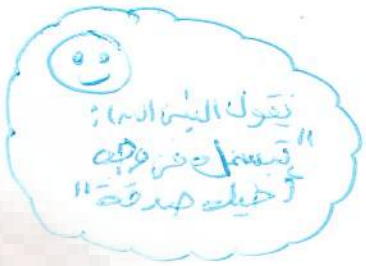
لا تنسونا من صالح الدعاء

Eng.\ Ahmed Taghyan

EGYPTIAN STEEL

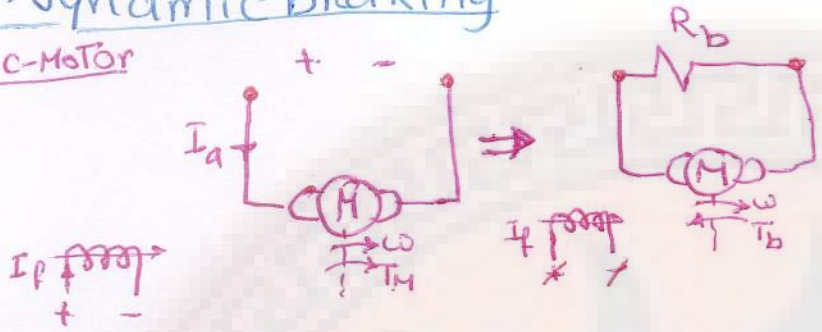
eng.ahmed.taghyan@gmail.com 01289000674

Breaking - الفرملة الكهربية
Electrical



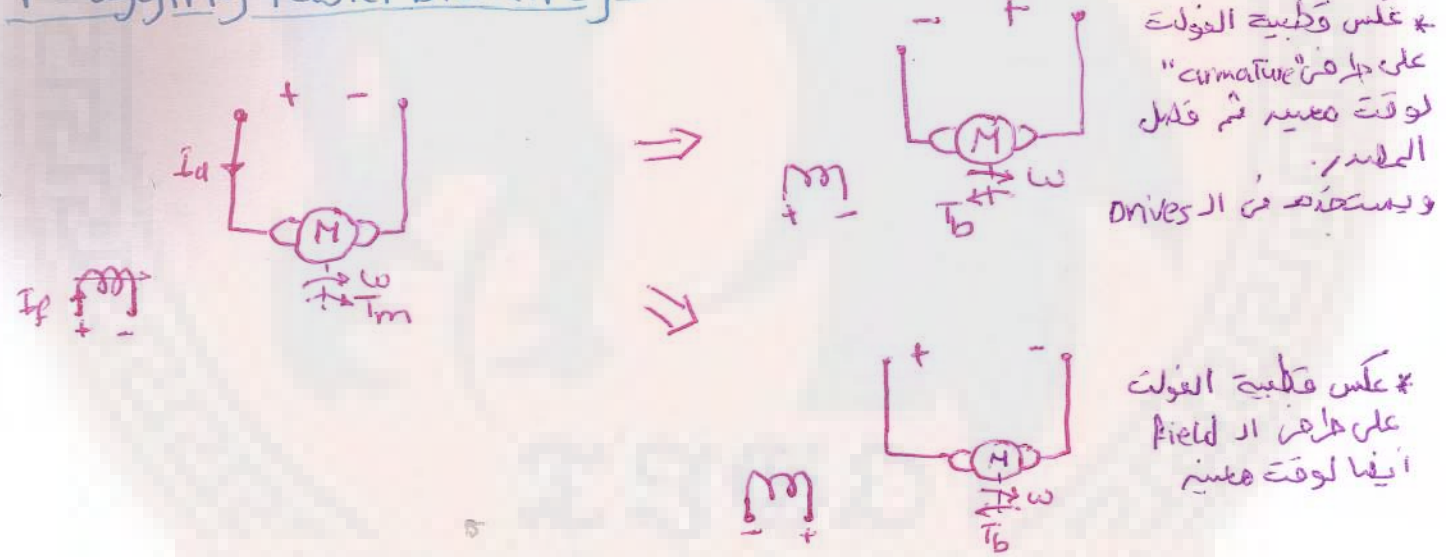
(a) dynamic breaking

DC-Motor



فرملة كلاسيكية حيث تقوم بقطع المصدر وتوصيل مقاومة على طرفي "armature" لاستهلاك التيار المتولد نتيجة الحركة الموجودة بعد توقف المصدر.

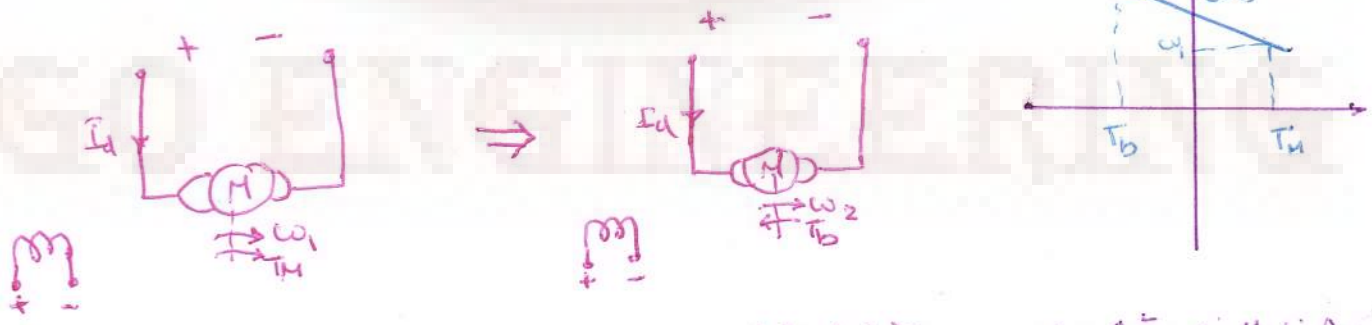
(b) Electrical Plugging faster breaking - (2-Q)



* عكس قطبية الفولت على طرفي "armature" لوقت معين ثم قليل المصدر.
ويستخدم في الـ Drives

* عكس قطبية الفولت على طرفي الـ field أيضا لوقت معين

(c) Regenerative breaking - (4-Q)

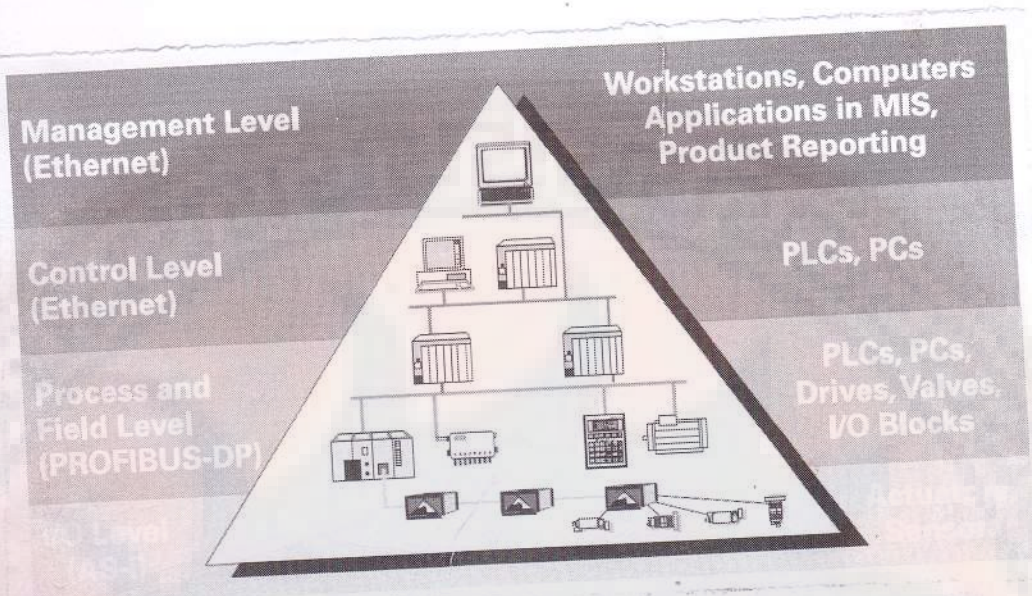


$\omega_1 < \omega_0$
motoring

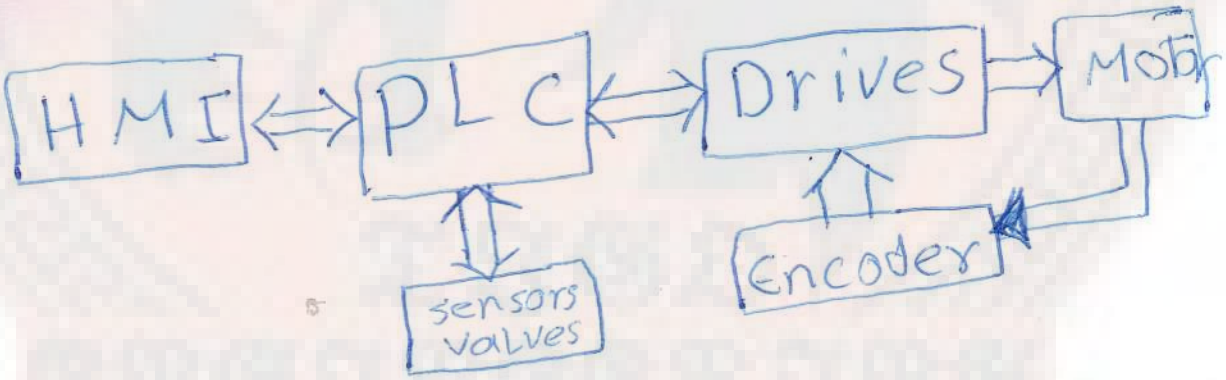
$\omega_2 > \omega_0$
breaking

* هذا النوع يقوم به Drive عند عكس Torq

TIA:
Totally Integrated Automation:



* هو نظام مراقبة كلياً من خلال "scada" ← "PCs" أجهزة كومبيوتر وأيضاً يتم التحكم فيها عن طريق "PCs" وتكون مراقبة sensors "حساسات"
* تحتوي هذه الأنظمة على "PCs" كومبيوتر، PLCs، sensors، Actuators، "Valves" ويتم الاتصال بينهم عن طريق Profibus، Ethernet



مصطلحات هامة

Torque العزم

Force * distance

* العزم مقدرة على طول ذراع الحركة

Speed السرعة

Distance / Time

* المسافة المقطوعة مقسومة على الزمن

خطية Linear

زاوية Angular

Acceleration تسارع

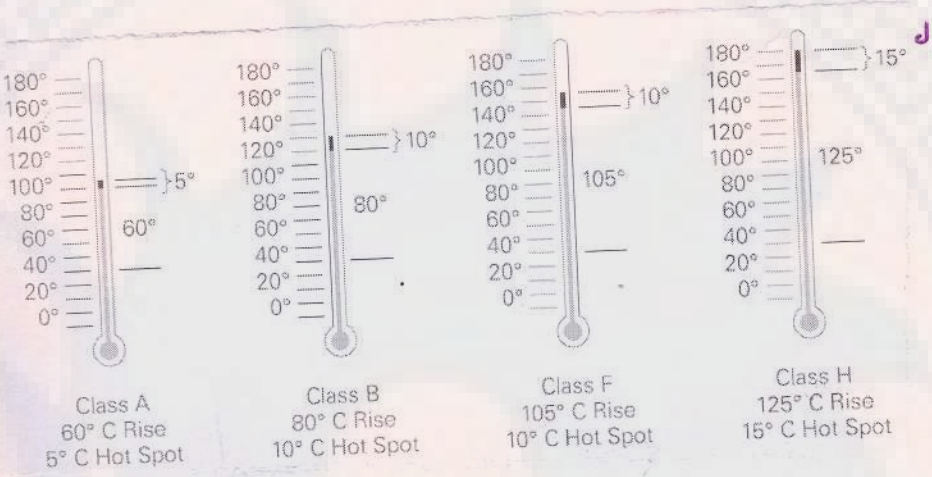
معدل الحرك هو الثبوت أو هو سرعة الى اخرى فى وقت معين

Deceleration

انخفاض الحرك هو سرعة الى أخرى أقل أو الى التوقف.

Temperature insulation class:

"درجة عزل الحرارة"



ويقصد بها تحمل عزل لحرك للحرارة

Control speed of DC Motor

EMF

$$\text{speed} \rightarrow \omega = \frac{Va - IaRa}{K\Phi}$$

Emf → 10% of nameplate Va

* Speed ∝ Emf
* Va, Ia ثوابت, Ra مقاومة armature للموتور

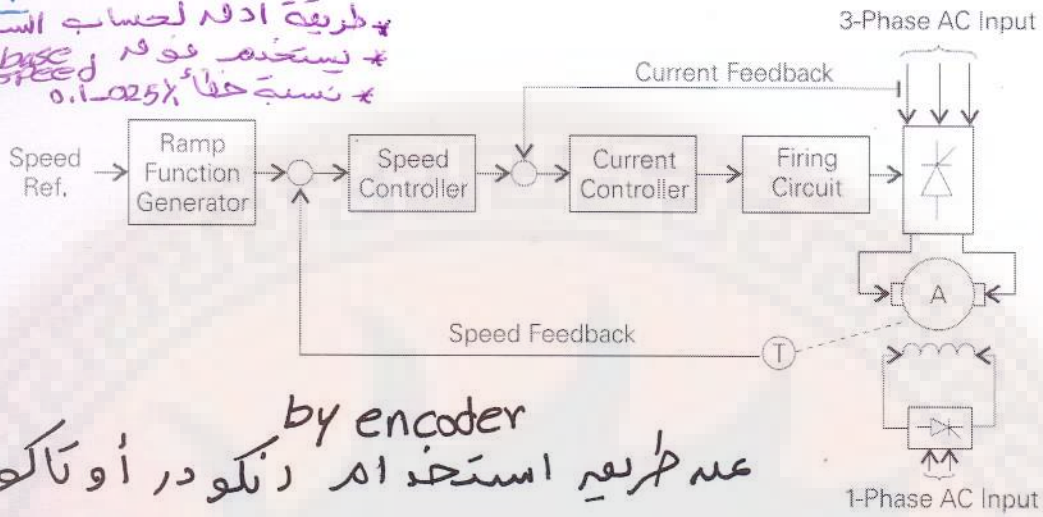
تحسب فى النهاية عند Tuning of drive

* يفضل تشغيل هذا نظام فى السرعة فوق base speed ← 0
* 2-5% نسبة خطأ فى السرعة

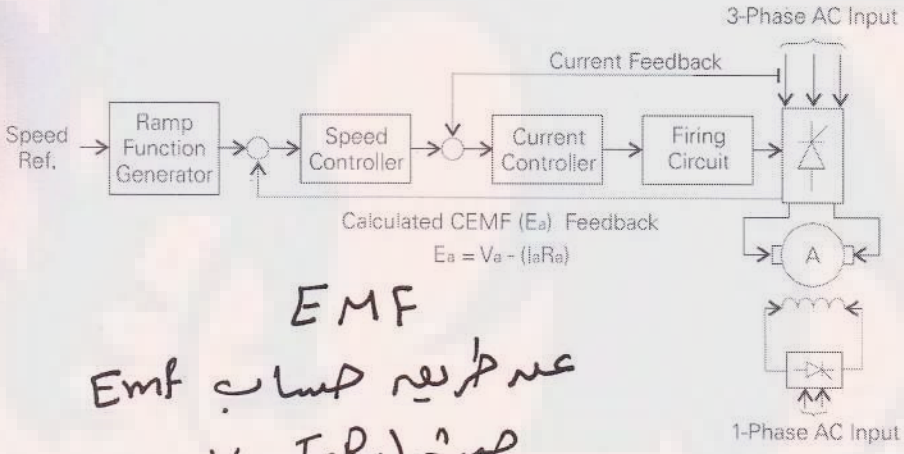
لا تنسونا من صالح الدعاء
Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

speed measurement
طريقة حساب السرعة

encoder
* طريقة أدق لحساب السرعة
* تستخدم فوق base speed
* نسبة خطأ 0.1-0.25%



by encoder
عن طريق استخدام انكودر أو تاكو .

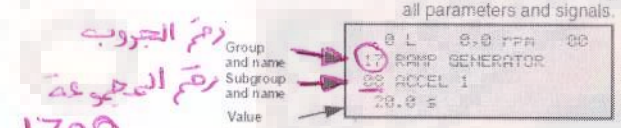


EMF
عن طريق حساب Emf
من $(Ea = Va - IaRa)$

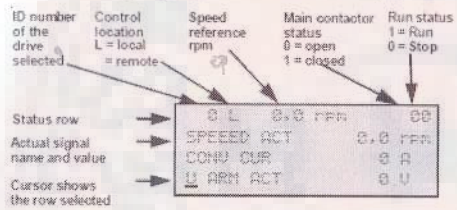
Hardware
١٠٥

Parameters
For selecting and adjusting all parameters and signals.

رقم الجروب
رقم المجموعة
1708



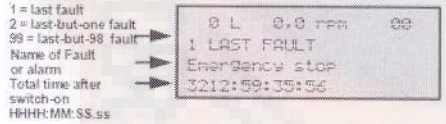
Actual
يعرض القياسات الحالية للموتور
Selects the display of feedback values plus the signal group and the error memory group.



Twin arrow keys
حركة سريعة
are used to change the group. In the parameter and reference presetting modes, you can alter the parameter value or the reference setting ten times faster by means of the twin arrow keys than by means of the single arrow key.

Local/Remote
is used to select local (control panel) or remote control.

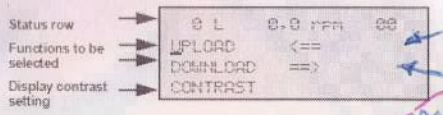
Reset
Error acknowledgement key.



On
in local mode switches the main contactor on.

يستخدموا في local mode لتشغيل المحرك

Function
Selects the "functions" operating mode; can be used to perform special functions such as uploading and downloading or application programming.



رفع القيم من OB الى Drive
تنزيل القيم من Drive الى OB

Drive
for subsequent extensions

Enter
is used in the following modes:
Parameter setting: enter new parameter value
Feedback value signal display: enter the current signal selection mode
Signal selection: accept selection and return to the feedback value signal display mode

Arrow keys
are used to select parameters within a group. You alter the parameter value or the reference setting in the parameter and reference presetting modes. In the feedback signal display mode, you select the line you want.

Start
starts the drive in local mode.

Stop
shuts the drive down if you are in local mode.

Reference
is used to activate the reference presetting mode.

Off
in local mode switches the main contactor off.

3 Control boards

3.1 Control Board SDCS-CON-2

كارت التحكم
يوصل به AO ، AI ، DO ، DI
وكل الأعمال وبه الـ cpu

The control board is based on the 80186EM microprocessor and the ASIC circuit DC94L01.

Jumper coding

S1 Characteristics for pulse encoder inputs

single ended: 5 V * / 12/24 V

differential: 5 V / 12/24 V * / 13 mA

Input AI2 used for temperature measurement via PTC

Ch	Terminal	22-23 *	23-24
AI2-	X3:7	n. c. to +10V	22 kΩ -/-+10V

S2 Initialisation with default values; read parameters from D33

* Normal start; read parameters from D35 after initialisation

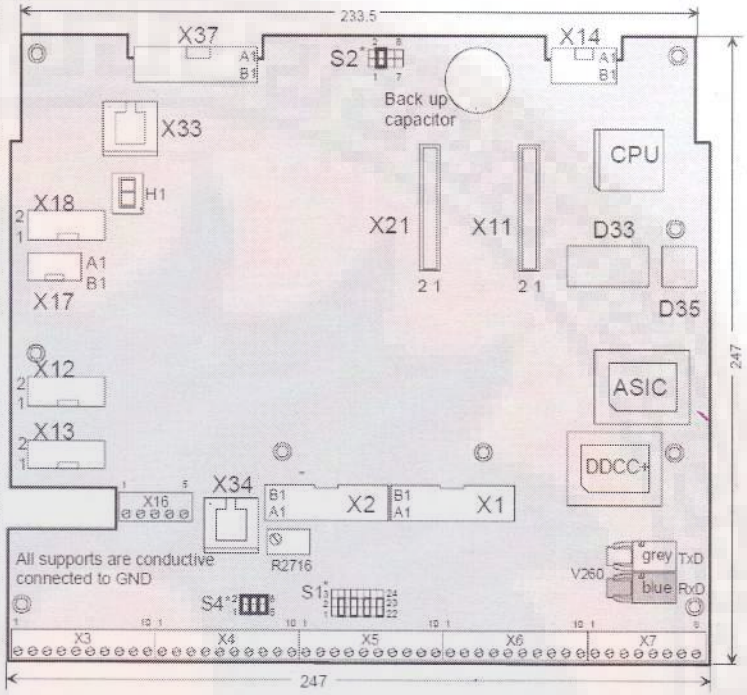
Bootstrap loader (can only be used with additional hardware and a PC-program)
Position of jumpers 1-2, 3-4 is random;
7-8 is parking position for jumper 5-6

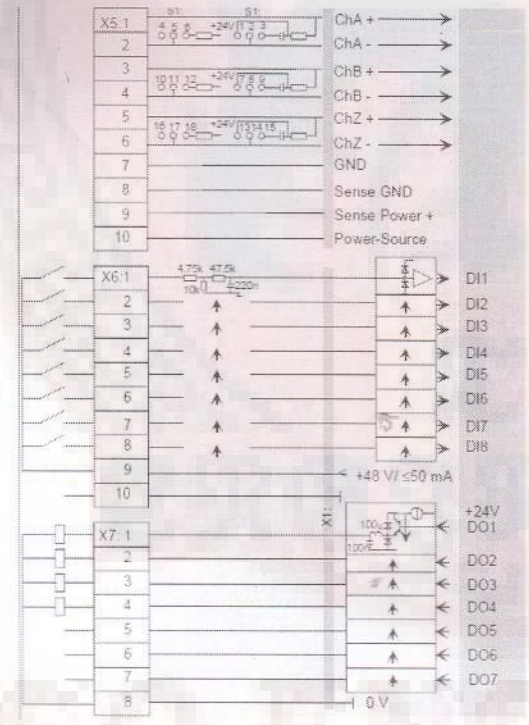
S4 * Tacho (+ and -) connected to AITAC; X3:4 connected to GND

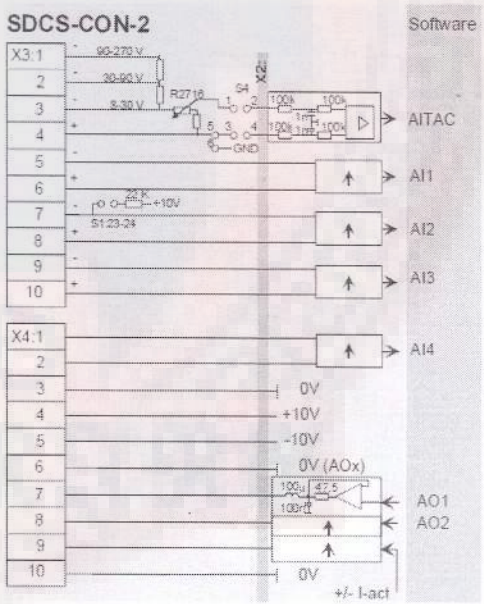
Tacho (+ and -) connected to AITAC

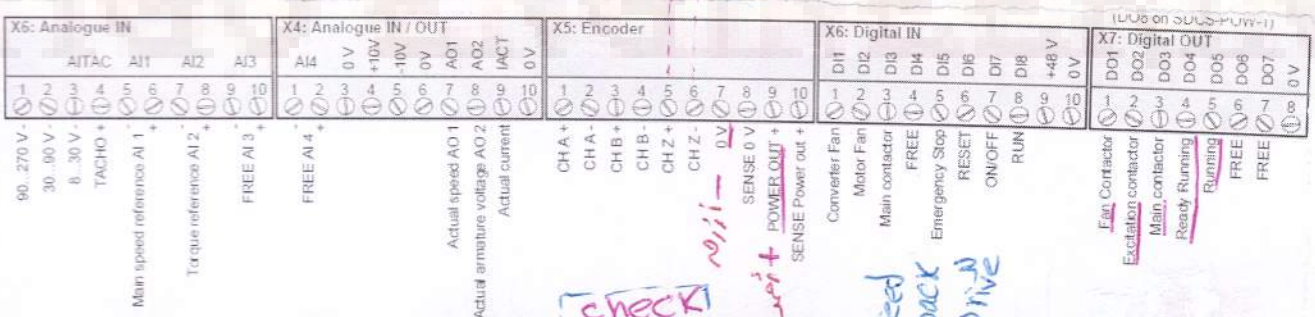
Position, if SDCS-IOB-3 is connected

* default value









check encoder A^+, A^- / B^+, B^- والزيرو

feed back drive

Categories of messages and display options

The thyristor power converters from the **DCS 500B/DCF 500B** series output general messages / power-up errors / error and alarm messages with the aid of a seven-segment display on the SDCS-CON-x processor board. The messages appear as codes. In the case of multi-character codes, the individual letters/digits are displayed in succession for 0.7 s at a time.
Additionally, in conjunction with the LC display of the CDP 31x display and control unit, the error and alarm messages and the status messages are available in plaintext.

General messages

They appear only on the seven-segment display of the SDCS-CON-x processor board.

	Description	Remark
8	Program not running	(1)
.	Normal state, no error/alarm messages	
L	Display if a different firmware package is loaded into the drive	

(1) Switch units off and on again electrically; if the error recurs, check the SDCS-POW-1 and SDCS-CON-x boards, and replace if necessary.

Power-up error (E)

Power-up errors appear only on the seven-segment display of the SDCS-CON-x processor board. The drive cannot be started up.

	Description	Remark
E1	Error in ROM test	(1)
E2	Error in RAM test	(1)
E3	TC connection board missing (not with software version S21.1xx)	
E4	Communication board SDCS-CON-x faulty	(2)
E5	No program for closed- and open-loop control in memory	(3)
E6	ASIC not OK	(1)
E7	Parameter FLASH identification failed	(1)

(1) Switch units off and on again electrically; if the error recurs, check the SDCS-POW-1 and SDCS-CON-x boards, and replace if necessary.

(2) Check communication board, plug on correctly, and replace if necessary.

(3) Reload firmware.

Error messages (F)

Error messages appear on the seven-segment display of the SDCS-CON-x computer board as Code F .. and on the LC display of the CDP 31x display and control unit as text. All error messages (with the exception of **F 17**, **F 18** and **F 44**) are (following elimination of the error concerned) resettable; **F 20** is self-resetting, if the communication function has been restored beforehand. To reset error messages, the following steps are required:

- Cancel the ON/OFF and RUN commands
- Eliminate the cause of the error
- Acknowledge error with the RESET command at the CDP 31x panel **or** by briefly setting the RESET command via binary input/serial interface
- Depending on the system conditions involved, generate the ON/OFF and RUN commands anew.

Error messages lead to cancellation of the signal **[10910]** and to the drive being completely or partially switched off.

4 Power Supply Board

4.1 Power Supply Board SDCS-POW-1

The SDCS-POW-1 board is designed for DCS 500 converter modules and is mounted on the electronic support. This board is used for all types of modules independant from current or voltage range.

The SDCS-POW-1 works on a switched mode basis in fly back configuration. It generates all necessary DC voltages for the SDCS-CON-2 and all other electronic boards. The input voltage can be selected via the switch SW1 either to 230 V AC or to 115 V AC. The following figure shows the instructions for the selection of the AC input voltage and for the selection of the encoder supply voltage.

If an SDCS-CON-2 (without I/O board IOB-3) together with a pulse encoder is used for speed measurement, the incremental encoder supply voltage must be selected by jumpers X5, X4 and X3.

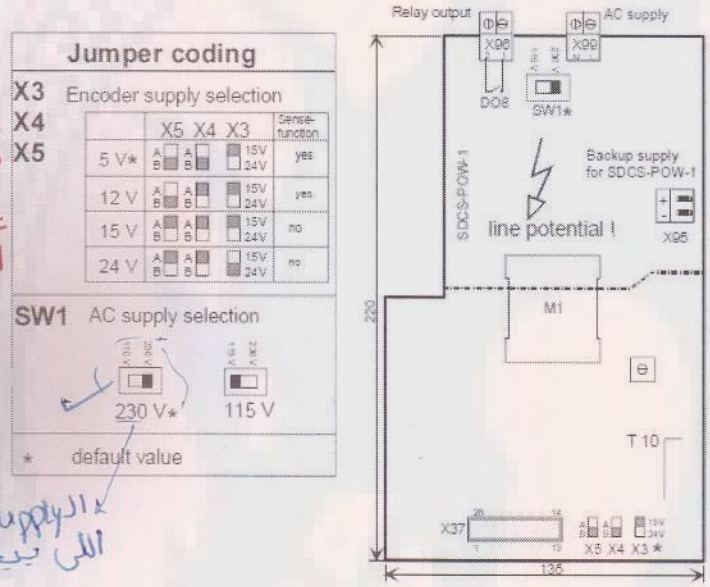
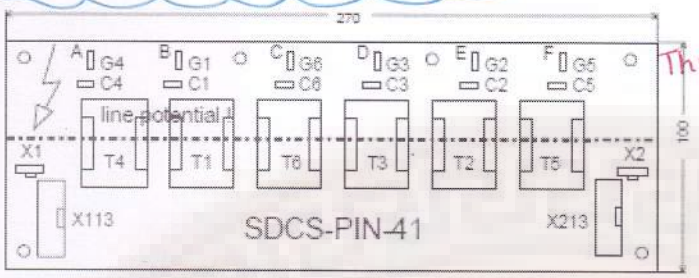


Fig. 4.1/1 Layout of the SDCS-POW-1 board

لا تنسونا من صالح الدعاء
Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

Pulse transformer board SDCS-PIN-41/PIN-41A



The board contains six pulse transformers with amplifiers.

Fig. 5.4/4 Layout of the SDCS-PIN-41/PIN-41A pulse transformer board

Measuring board SDCS-PIN-5x

This board is always used together with SDCS-PIN-41 board. On this board there are the circuits located needed for current, voltage and temperature measuring and for hardware coding.

The current is measured by current transformers at the AC supply, rectified by a diode bridge and scaled with burden resistors to 1.5 V as rated current. The current response is adjusted by cutting out resistors (R1 ... R21) from the board according to the coding table. The resistors R22 ... R26 are used for the current equal to zero detection. These resistors must be cut off according to a second table.

Voltages (U1, V1, W1 and C1(+) and D1(-)) are measured by using high ohm resistor chains. Scaling of AC and DC voltage is done by activating 1 MΩ resistors (= cutting out short circuit wires, which are represented by a low ohmic resistance).
For the voltage measurement 5 resistor chains are used:

U1:	W1	to	W5
V1:	W6	to	W11
W1:	W12	to	W16
C1(+):	W17	to	W21
D1(-):	W22	to	W26

If there is a need for voltage adaption, all 5 chains must be handled in the same way.

When gavanically isolated measurement is needed, please contact your ABB representative.

Note! Actual voltage signals U1, V1, W1, C1(+) and D1(-) of the main circuit are not galvanically isolated from the control board.

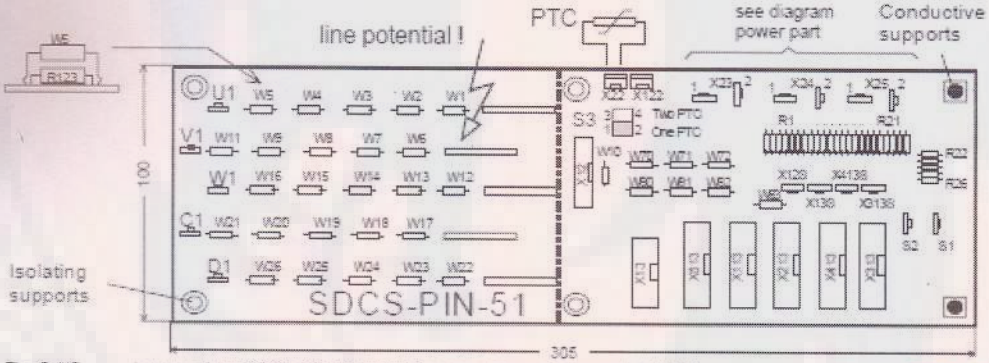


Fig. 5.4/5 Layout of the SDCS-PIN-51 board for converters with line volt. >500 V

Current coding

معاوضات قياس التيار

Construction type			A5				C4							
Current transf. ratio			2500:1				4000:1							
Rated current [A]			900	1200	1500	2000	2050	2500	2650	3200	3300	4000	4750	5150
R1-R4	18 Ω	Rated current scaling	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R5	18 Ω		⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R6	18 Ω		⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R7	18 Ω		⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R8	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R9	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R10	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖
R11	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖
R12	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖
R13	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖
R14	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖
R15	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
R16	18 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖
R17	33 Ω		⊖✕⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖
R18	68 Ω		⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
R19	120 Ω		⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖
R20	270 Ω		⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖
R21	560 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖
R22	47 Ω	Zero current detection	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R23	47 Ω		⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
R24	47 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖—⊖
R25	47 Ω		⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
R26	100 Ω		⊖✕⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖

A5, C4 نوع Drive
Transistor بتاع الـ
Thyristor بتاع

⊖✕⊖ يعني القياس بتاع الـ Jumper أو المقاومة حسب التشغيل أو التيار

Voltage coding

معاوضات قياس الفولت "Jumper"

ons truction type	A5		4				
onv. nom. voltage ①	4 400 5 500	6 600 7 690	4 400 5 500	6 600	7 690	8 790	9 1000
alue f. conv. nom. volt arS I S bloc	0 type coding		500	600	690	800	1000
easuring board S S	I -52	I -51	I -52	I -51	I -51	I -51	I -51
1, 6, 12, 17, 22	⊖—⊖	⊖✕⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖
2, 7, 13, 18, 23	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖
3, 8, 14, 19, 24	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖
4, 9, 15, 20, 25	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖
5, 11, 16, 21, 26	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖

① the converters can be used at lower line voltage then specified by the y-value without hardware modifications, if the nominal line voltage applied to the converter is not lower than 45 for y 5...9 and not lower than 55 for y 4.

type coding

معاوضات نوع Drive

ons truction type	A5						C 4
Current A	1200	1500	2000	900	1500	2000	2000
Voltage ma .	500	500	500	600 690	600 690	600 690	
70	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
71	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
72	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖
80	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
81	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖—⊖
82	⊖—⊖	⊖—⊖	⊖—⊖	⊖✕⊖	⊖✕⊖	⊖✕⊖	⊖—⊖
83	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖	⊖—⊖

see Software description

Temp. sensor coding

R 57 as a temp. sensor for A5, C4-2Q, C4-4Q
S3 4 ○ ○ 3 2 ⊖—⊖ 1

2 - 4 coding

	2	4
10	⊖✕⊖	⊖—⊖

⊖✕⊖ indicates a removed umper

able 5.4 1 Settings of the S S- I -51 board if a S converter is equipped with it by A

oard used as a spare part
- default all umpers , are in ⊖—⊖ condition
- ensure the correct converter type related settings

7.1 Communication board SDCS-COM-5

This board is used for communications to DCS 500 converter modules for commissioning and maintenance purposes. It consists of 3 different communication channels. All RxD channels (receiver) have blue color, all TxD channels (transmitter) have grey color. If any connections should be made always connect the same color with each other (plug and socket) .

Channel 1 is a HDLC channel of 1.5 Mbits/s and is used for the communication with a PC. Channel 2 cannot be used together with software version S21.xxx.

Channel 3 is a DDCS channel of up to 4 Mbits/s and is used if a serial link based on PROFIBUS hardware, CS31 hardware or MODBUS hardware should be realized. If one of these possibilities should be used an adaptation module is needed. Please refer to the documentation which is available for the link system needed.

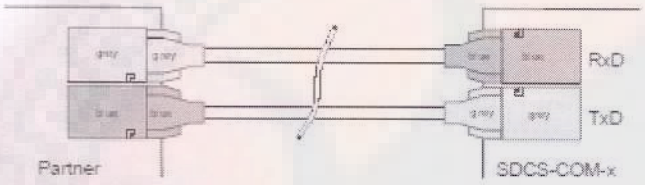
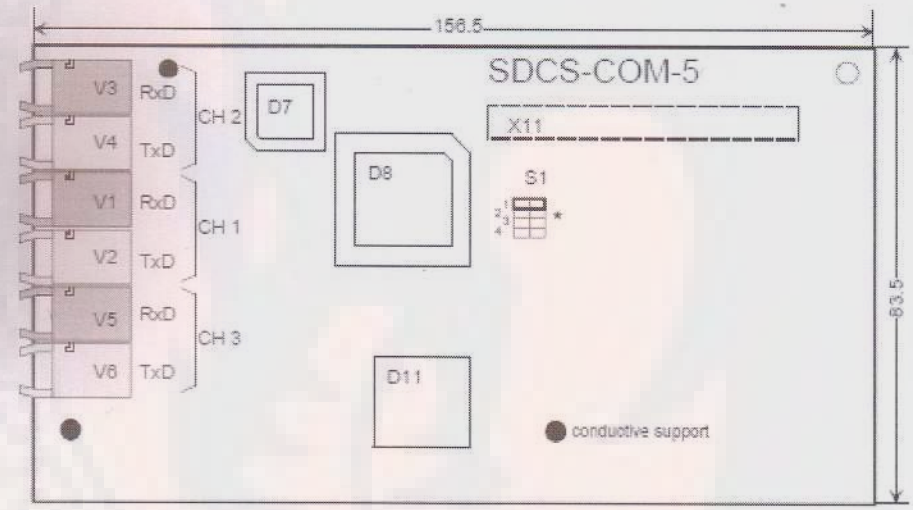


Fig. 7.1/1 Connection between SDCS-COM-x and a partner



Jumper coding

Converter number	Coding for channel 2
1	S1 *
2	S1
3	S1
4	S1

لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

8.3 DCF503A-0050 and DCF504A-0050 (external)

كارتة الـ Field
وهى خارجية وهى تحوى Field وتقوم بتغذية rectifier

The **half controlled** field exciter unit DCF503A-0050 consists of the SDCS-FEX-32A board, two thyristor/diode power modules and auxiliaries (power supply, line choke). The **full controlled** field exciter unit DCF504A-0050 consists of the SDCS-FEX-31A board, four anti-parallel thyristor/ thyristor power modules and the same auxiliaries.
The control is structured similar to the SDCS-FEX-2 field supply. A micro controller is used for controlling and firing. The DC current is measured by using an AC current transformer (same configuration than at SDCS-FEX-2).

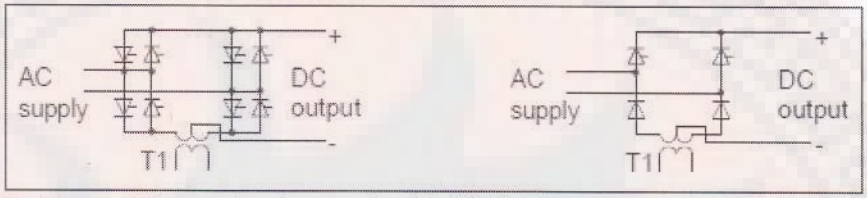


Fig. 8.3 /1 Different versions of power section of the DCF50xA-0050

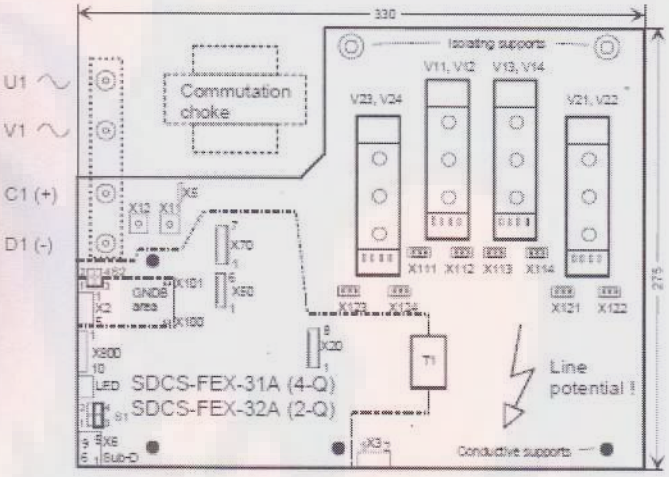


Fig. 8.3/2 Layout of the DCF504A-0050 field exciter unit

Setting X800 Switch		
	OFF *	ON
1	Node no. 1 serial link CDN-2	Node no. 2 serial link CDN-2
2 3 4 5 6 7	not used	not used
8	Field exciter mode	Test mode
9	Bridge reversal time: 4 cycles	extended; Bridge reversal time
10	Serial link to CDN-1, CDN-2	Not used - don't select

* Default value for all switches
The settings are read during initialization.

Jumper Coding	
Grounding of RS485 Transmission driver	
S2: 1-3 *	GNDB isolated
S2: 1-2	GNDB grounded via RC circuit
S2: 3-4	GNDB direct grounded
CPU mode	
S1: 1-2	Firmware download
S1: 3-4 *	Field exciter mode

* Default value

ملحوظة

* عند تغيير أى كارتة من هؤلاء يجب:

① التأكد من كود الكارتة نفس الكود SDCS-...-... القديم

② التأكد من أن جميع الـ Socket فى الكارتة الحديثة تم تغيير كالكارتة التالفة [5.]

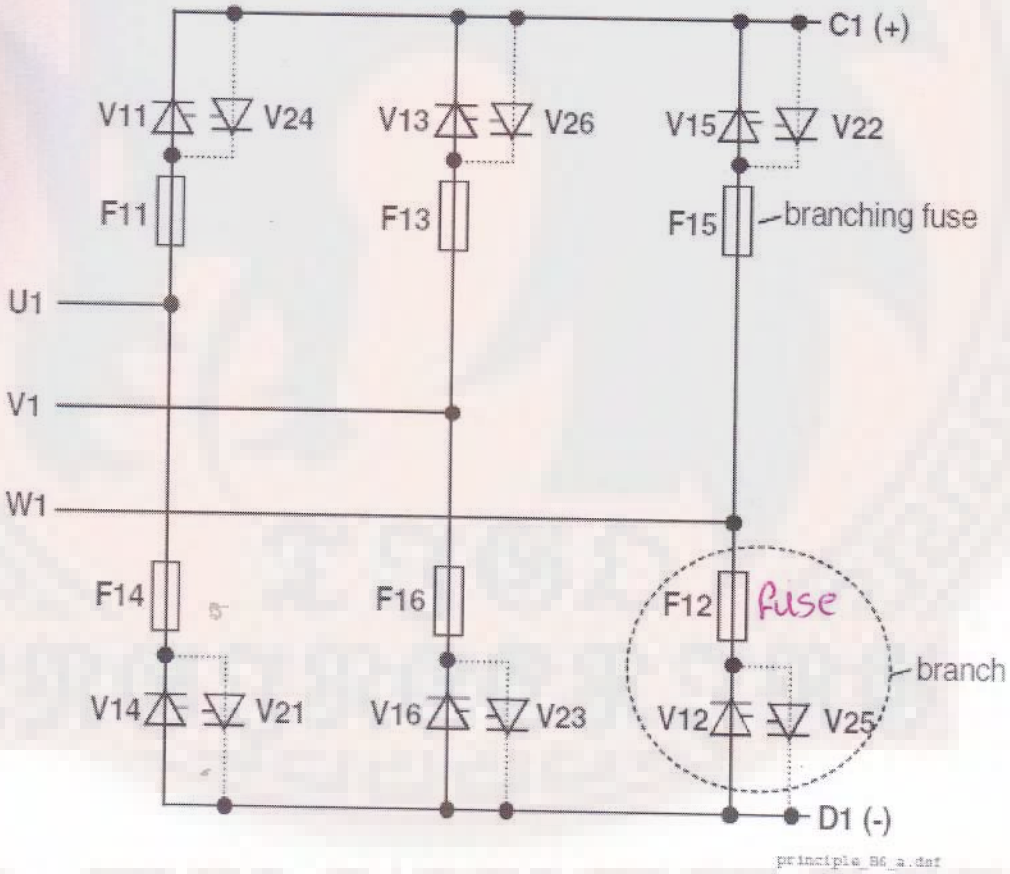
③ تدخيل كابلات الـ Data [X.] بجميع توصيلاتها الكابلية

Thyristor check

مثال (17) على

باستخدام (avo) يمكننا قياس مقاومة أى Thyristor وذلك بالقياس بين V1, V2 و C1, D1

* عند تغيير Thyristor يجب التأكد من التيار "rated crt" أو رقمة والتأكد من وضعه بالوضعية الصحيحة وتوصيل gate.



لقياس W1 , D1 F12 ومقاومة V12

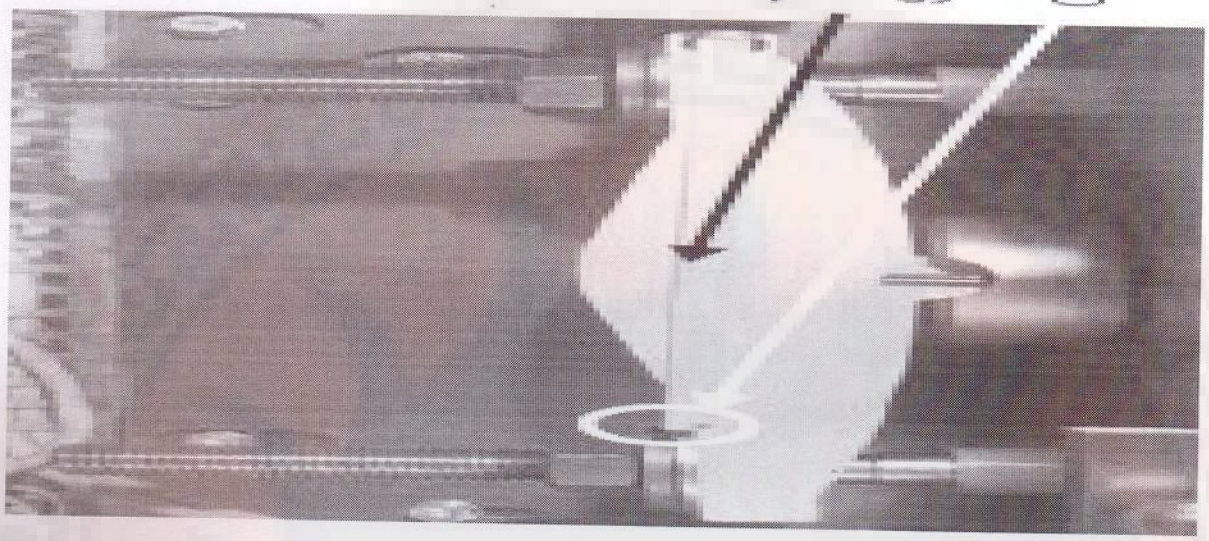
V25 نعكس polarity بتاع multimeter نعكس و

لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

ملف
(18)
الملوك

Torque indcating

عند استبدال أي Thyristor يجب أن جهاز قياس الـ Torque كمان الهور الثانية وضبطة برضه أو حل أحدى الصولينة



(2) ١

(١) X

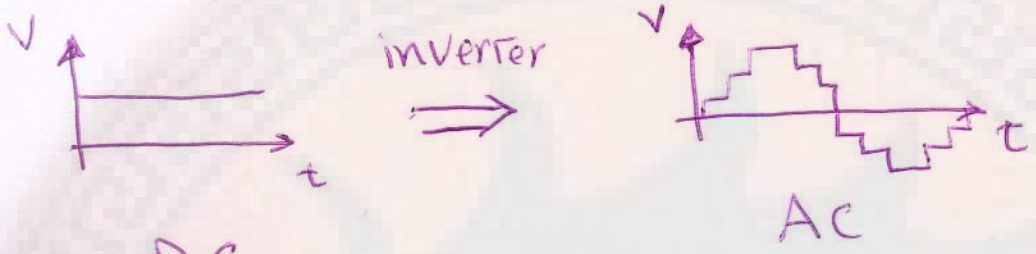
لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

Choke reactor

جبار (١٧) الجابرة

* نتيجة التبديل بسيرستور Thyristors يحدث S.C في الدائرة هما قد يؤدى لانقطاع التيار / لذا نستخدم reactor لتفادى حدوث ذلك

* يقوم أيضا بحفظ THD "Total harmonic Distortion" الناتجة من تحويل من AC ← DC والعكس



DC Ac

* يعمل الـ Drive من S.C عند التحميل على الـ Motor

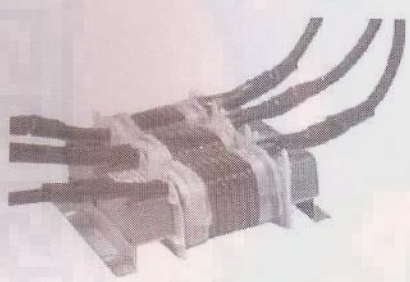


Fig. 1

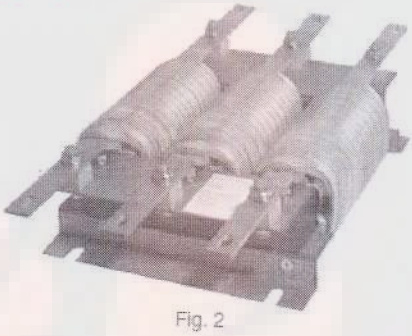


Fig. 2

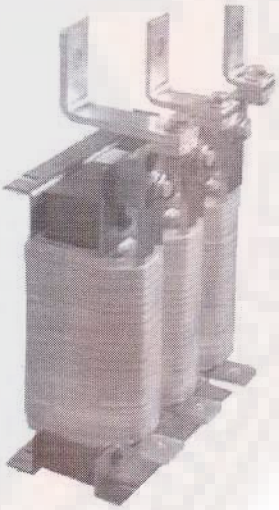


Fig. 3

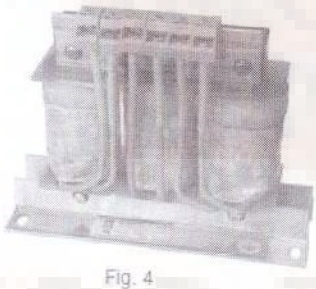


Fig. 4

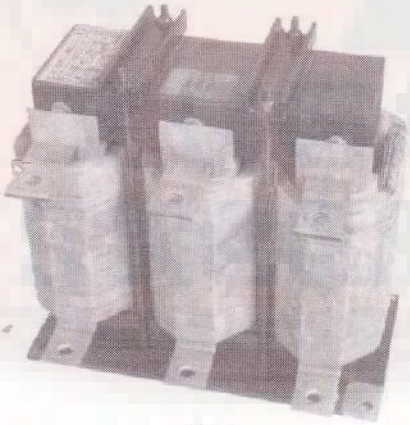
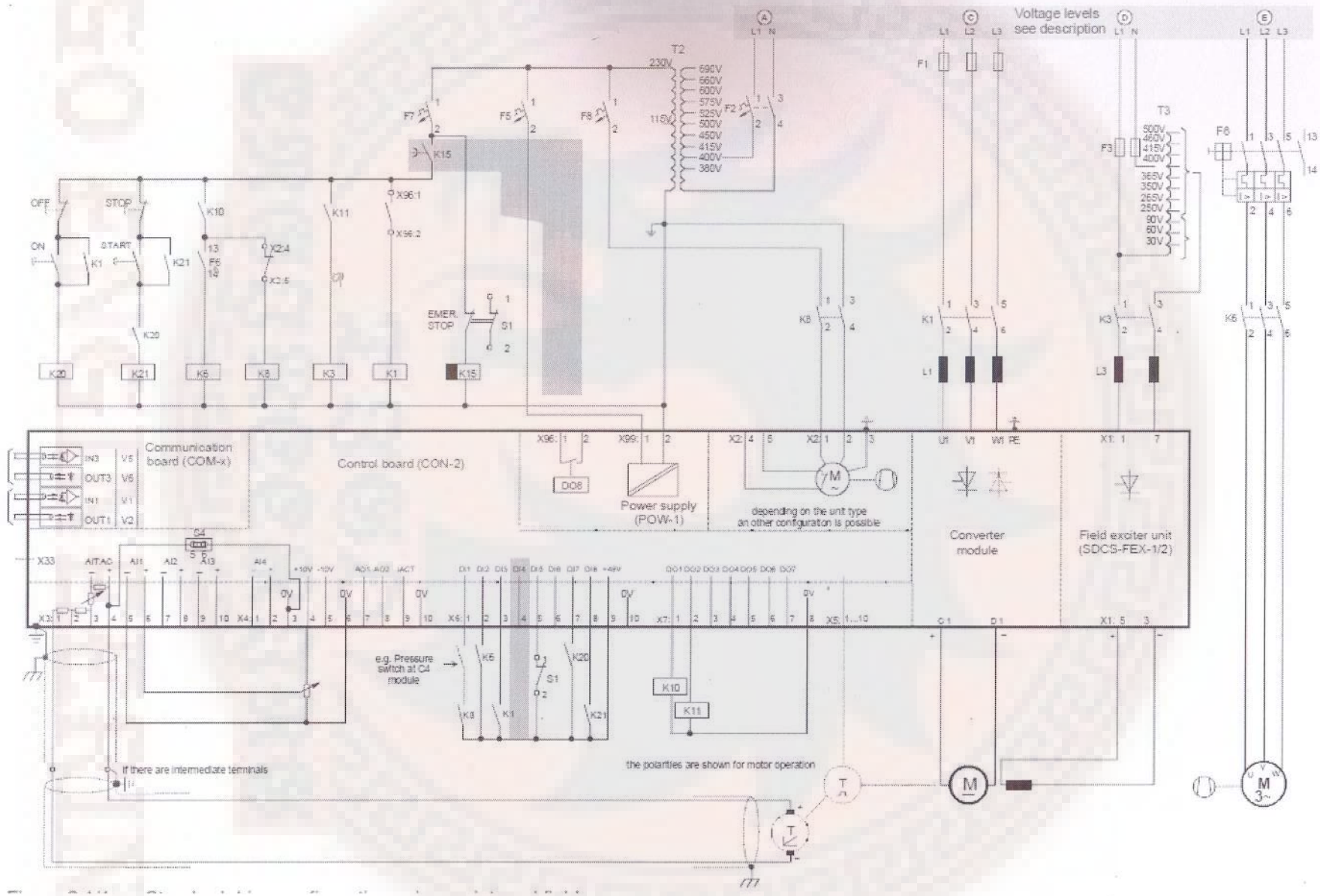


Fig. 5

لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

Electrical panel diagram



Eng.\ Ahmed Taghyan

EGYPTIAN STEEL

eng.ahmed.taghyan@gmail.com 01289000674

Alarm

Alarm messages (A)

Alarm messages appear on the seven-segment display of the SDCS-CON-x computer board as Code **A** ... and on the LC display of the CDP 31x display and control unit as plaintext. They are displayed only if no error message is active. Alarm messages (with the exceptions of **A 101** and **A 102**) do not cause the signal 10910 to be cancelled or the drive to be switched off.

Note

The error and alarm messages are listed in several languages in Chapter 10.

Status signals

The status of the drive functions (autotuning controllers, saving values) is indicated by the status signals 11201 and 11202. The status of the first and/or second field supply unit, the torque control and the current controller is indicated by the signals 11203 to 11205, and is regularly updated by the power converter software, enabling users to check it when one of the three signals is selected.

Depending on the unit being used (CDP 31x or CMT Tool), plaintext or a number will be shown on the display/screen. This number constitutes a code, which is equivalent to the plaintext for signal 11201; for all others, it is a binary-coded decimal number (the 16-bit word with the binary value for each signal is converted into decimal).

Parameter	Code/Bit	Description / Explanation of signals
11201	0...49	**COMMIS_STAT**: result of a drive function. Provides as feedback the status information when the parameter DRIVEMODE (1201) was used to start a drive function.
	50...61	Provides as feedback the status information when the parameter DRIVEMODE (1201) was used to start the drive functions 3, 5 or 6 (autotuning).
11202	0...6	**BACKUPSTOREMODE**: status of this operating mode. This operating mode is used to pass commands to the drive's parameter handling routine.
	7...17	During command execution, the value of BACKUPSTOREMODE shows what is happening, or the cause of the error if the command fails.
11203	–	**FEXC_STATUS**: status of field exciters 1 and 2
11204	–	**TC_STATUS**: status of the torque control
11205	–	**BC**: current controller status. If the value of BC = 0, everything is in order. Otherwise, the different bits of BC will indicate the cause of the current controller disable.

ممكن انه في خطأ بس مش عطلش الـ Drive او ممكنه يعطل الـ Drive "Fault" بعد مدة لو متعلجتش الـ "Alarm"

وبيكون حرف A وبليه رقم الـ Alarm

A 102

وبنظهر على اد حرف

وبالتتبع هي بيتم "reset" لـ Alarm

Parameter values will be saved by means of the parameter **BACKUP STORE MODE (11202)**. When the action is finished after writing or reading of parameters the mode is changed to 0 [NONE].

BACKUPSTORE MODE:

0 =	[NONE]	no backup
1 =	[SAVE MOT1 SET]	save motor set 1 to FPROM memory.
2 =	[SAVE MOT2 SET]	save motor set 2 to FPROM memory.
3 =	[FACTORY SET VALUE]	default values are restored to the RAM memory
4 =	[SELECT MOT1 SET]	read motor set 1 from the FPROM memory
5 =	[SELECT MOT2 SET]	read motor set 2 from the FPROM memory

• *Settings and commissioning functions*
SETTINGS function block

This block serves for scaling all important signals. It is subdivided into 5 parts.
The parameters 517 to 521 are only needed, if a C4 type converter is used. For more details, please see OPERATING INSTRUCTION.

In special cases, the calculated EMF needs to be smoothed. Parameter **EMF_FILT_TC (513)** serves for this reason.

The converter can display parameters and internal signals in physical values. To be able to do so, some basic values have to be scaled:

U_MOTN_V (501)	nominal motor voltage
I_MOTN_A (502)	nominal motor current
I_MOT1_FIELDN_A (503)	nominal field current for field supply unit 1
I_MOT2_FIELDN_A (504)	nominal field current for field supply unit 2, if there is one
FEX_SEL (505)	selection of field supply unit

There are several signals, which can be used for indication. The signal armature voltage is already connected to the analog output 2. The scaling of these signals is different.

U_ARM_ACT (10505)	actual DC output voltage
	scaling: 100% = 4095 equal 1.35 * P507 in volt
TORQUE_ACT (10503)	calculated actual torque, based on armature current and flux signal
	scaling: 100% = 4000 equal nominal motor torque, if P502 is set to nominal motor current and P503/504 is set to nominal motor field current
CONV_CUR_ACT (10501)	actual DC output current
	scaling: 100% = 4095 equal nominal converter current in A
ARM_CUR_ACT (10502)	actual DC output current
	scaling: 100% = 4095 equal nominal motor current in A, if P502 is set to nominal motor current
CURR_ACT_FILT_TC (523)	serves for smoothing of current actual signals 10501 and 10502

In a similar way, some basic scalings have to be done for the motor, they have to be done for the network too.

PHASE_SEQ_CW (506)	phase rotation
U_SUPPLY (507)	nominal line voltage

Selection of the speed actual measurement

Speed measurement mode is selected by means of parameter **SPEED MEAS MODE (2102)**.

0 = **[ENCODER A+,B dir]**
ch A pos edges for speed; ch B: direction

1 = **[ENCODER A+-]**
ch A: pos. and neg. edges for speed

2 = **[ENCODER A+-,B dir]**
ch A pos and neg.edges for speed; ch B: direction

3 = **[ENCODER A+-,B+-]**
ch A and B and pos. and neg. edges for speed and direction

4 = **[ANALOG TACHO]**
AITAC is used

5 = **[EMF SPEED ACT]**
speed actual is calculated from the EMF motor; this is the default setting

Reference increment and decrement

The input **[INCR] (1918)** activates incrementing of speed reference. The speed reference acceleration time is defined with parameter **ACCEL 1 (1708)** in RAMP GENERATOR function block. The input **[DECR] (1919)** activates decrementing of speed reference. The speed reference deceleration time is defined with parameter **DECEL 1 (1709)** in RAMP GENERATOR function block.

Limitation

The maximum and minimum limits for speed reference are set with parameters **OHL (1921)** and **OLL (1922)**.

SPEED_CONTROL function block

Gain and Integral time settings

The speed error is formed in the SPEED ERROR function block, and it is connected to input **IN (2006)**. The proportional gain (scaling 100 = 1 gain) **KP (2014)** and integrator time constant (scaling 1 = 1ms) **KI (2018)** are the main parameters of the speed controller PI-function. The output of the integral function can be reset by setting the input **[RINT] (2007)** to state 1. Hold function is activated by setting the input **[HOLD] (2012)** to logical state 1.

The P-gain reduction

The adaptive gain of the speed controller is used to smooth out disturbances which are caused by e.g. low load and backlash. Moderate filtering of speed error **FRS (2005)** is typically not enough to tune the drive. Especially if there is a substantial backlash in the drive and the drive oscillates at a low torque due to the mechanics.

Parameter **KPSMIN (2015)** determines the proportional gain when the controller output is zero. When the output exceeds the value of parameter **KPSPOINT(2016)**, the proportional gain is normal **KP (2014)**. The rate of change of the proportional gain can be smoothened by means of parameter **KPSWEAKFILT (2017)**.

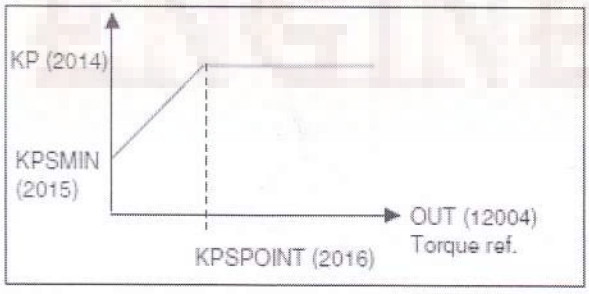


Figure 17 *Reduction of gain as a function of torque reference*

الدرس (24) الحكيم

Proportional term تفاعلي

The proportional term produces an output value that is proportional to the current error value. The proportional response can be adjusted by multiplying the error by a constant K_p, called the proportional gain constant.

The proportional term is given by:

$$P_{\text{out}} = K_p e(t)$$

رقم مضروب في الدالة الخرج

Kp → 100% — 400% — 150% DCS50
1 — 4 — 1.5 DCS800

A high proportional gain results in a large change in the output for a given change in the error. If the proportional gain is too high, the system can become unstable (see the section on loop tuning). In contrast, a small gain results in a small output response to a large input error, and a less responsive or less sensitive controller. If the proportional gain is too low, the control action may be too small when responding to system disturbances. Tuning theory and industrial practice indicate that the proportional term should contribute the bulk of the output change [citation needed]

Integral term تكاملي

The contribution from the integral term is proportional to both the magnitude of the error and the duration of the error. The integral in a PID controller is the sum of the instantaneous error over time and gives the accumulated offset that should have been corrected previously. The accumulated error is then multiplied by the integral gain (K_i) and added to the controller output.

The integral term is given by:

$$I_{\text{out}} = K_i \int_0^t e(\tau)\, d\tau$$

رقم مضروب للزمن في الدالة

The integral term accelerates the movement of the process towards setpoint and eliminates the residual steady-state error that occurs with a pure proportional controller. However, since the integral term responds to accumulated errors from the past, it can cause the present value to overshoot the setpoint value (see the section on loop tuning).

Manual tuning

If the system must remain online, one tuning method is to first set K_i and K_d values to zero. Increase the K_p until the output of the loop oscillates, then the K_p should be set to approximately half of that value for a "quarter amplitude decay" type response. Then increase K_i until any offset is corrected in sufficient time for the process. However, too much K_i will cause instability. Finally, increase K_d, if required, until the loop is acceptably quick to reach its reference after a load disturbance. However, too much K_d will cause excessive response and overshoot. A fast PID loop tuning usually overshoots slightly to reach the setpoint more quickly; however, some systems cannot accept overshoot, in which case an *over-damped* closed-loop system is required, which will require a K_p setting significantly less than half that of the K_p setting that was causing oscillation [citation needed]

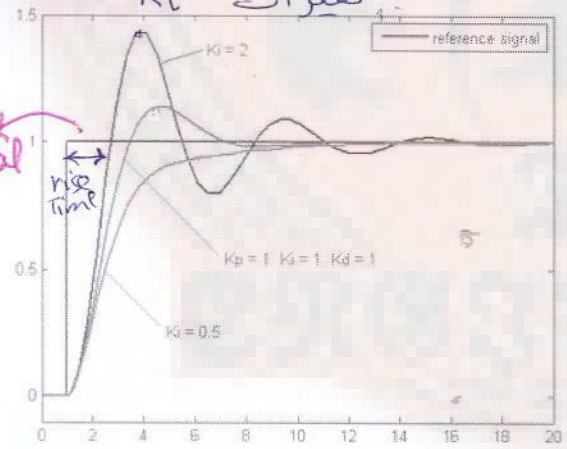
وقت الوصول — لاتزامن — مع الزيادة — يقلل — يزيد

Effects of *increasing* a parameter independently[13]

Parameter	Rise time	Overshoot	Settling time	Steady-state error	Stability[14]
K_p	Decrease	Increase	Small change	Decrease	Degrade
K_i	Decrease	Increase	Increase	Eliminate	Degrade
K_d	Minor change	Decrease	Decrease	No effect in theory	Improve if K_d small

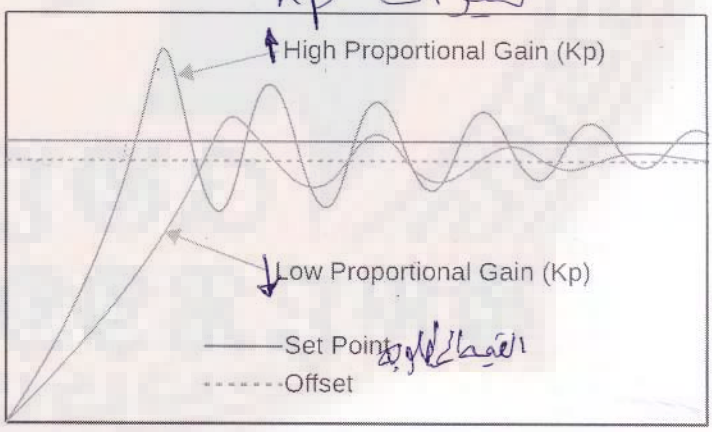
increase زيادة
Decrease تقليل

تغيرات Ki



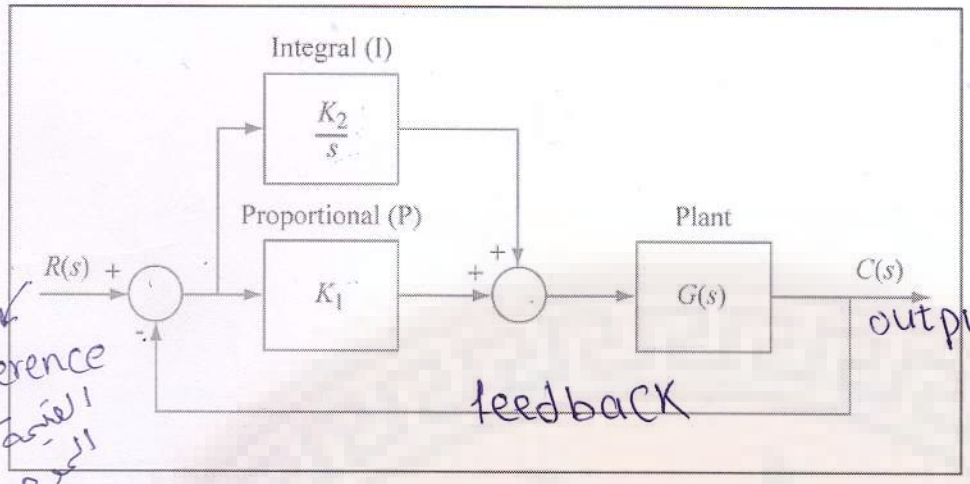
ref-signal

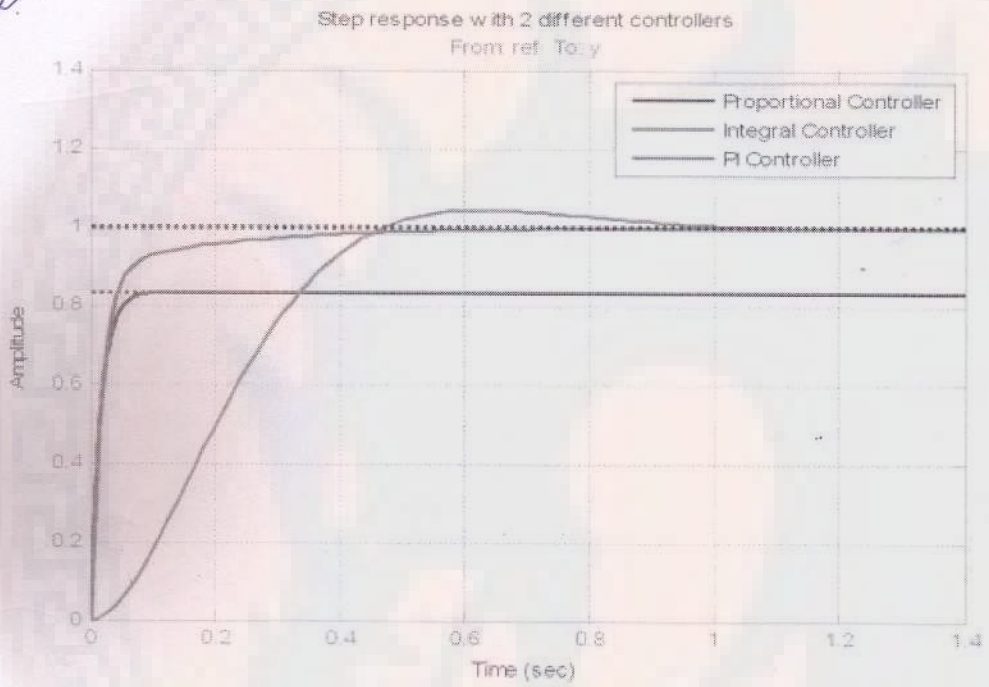
تغيرات Kp

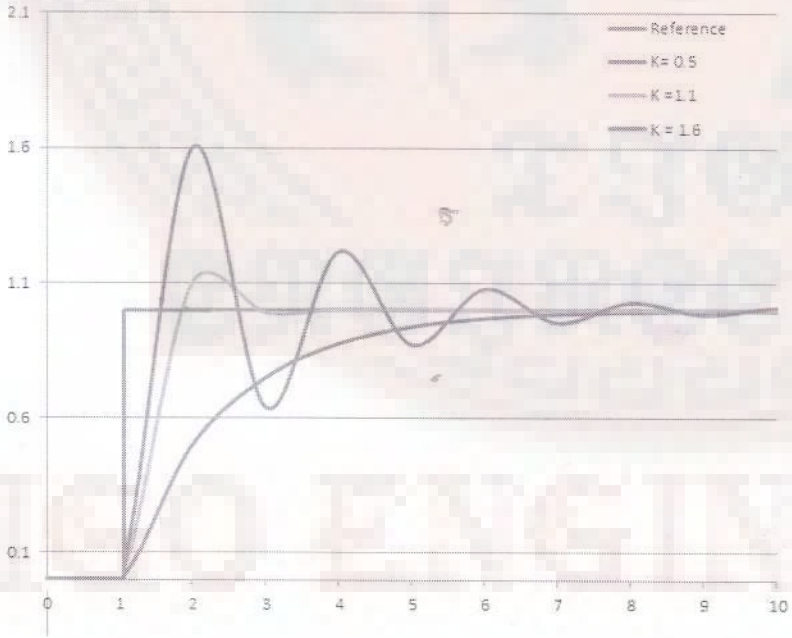


الفرق الخطأ

لا تنسونا من صالح الدعاء
Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674







البر
(26)
الرحيم

PI- Regulation

The parameters of the PI controller can be set either with the autotuning or manual tuning function. **ARM CURR PI KP (407)** determines the gain of the regulator and **ARM CURR PI KI (408)** determines the integral time constant of the regulator.

يمكنك ضبط PI عن طريق manual أو "autoTune"

Scaling of the gain KP

PI-controller input and output values are scaled so that gain value 100% produces in the output the same value as can be seen in the input. This kind of scaling is used in the current controller of the DCS500B.

P → 100 % تعني لا تغير في الـ op

P → 150 % تعني 1.5 زيادة في الـ op

$$output = \frac{ARM\ CURR\ PI\ KP * error}{256}$$

So, default value 300 is equal to gain 300/256=1.17 (117%)

Scaling of the Time Constant KI

Integral gain is calculated from the time constant:

لكي أحول بكود ما وقت بال "ms"

$$ARM\ CURR\ PI\ KI = 16384 * \frac{scantime}{TC}$$

where scantime = 3.33 ms in 50Hz network
= 2.77 ms in 60Hz network
TC = time constant in ms.

Discontinuous Current Point

Parameter **ARM CONT CUR LIM (409)** is the converter actual current at the point where discontinuous current of the armature circuit changes to continuous current. By using autotuning this point will be defined automatically. In manual tuning the point must be measured from the armature circuit by means of e.g. an oscilloscope. Actual converter current value **CONV CUR ACT (10501)** is set in parameter **ARM CONT CUR LIM (409)**. There is also a status bit B6 at **TC_STATUS (11204)**, bit value 1 = armature current is discontinuous.

يستخدم لتغيير قيمة armature من حالة discontinuous ↓ continous وبكود ما عن طريق "autoTuning" أو ضبط قيم يدوية باستخدام القياس للـ oscilloscope

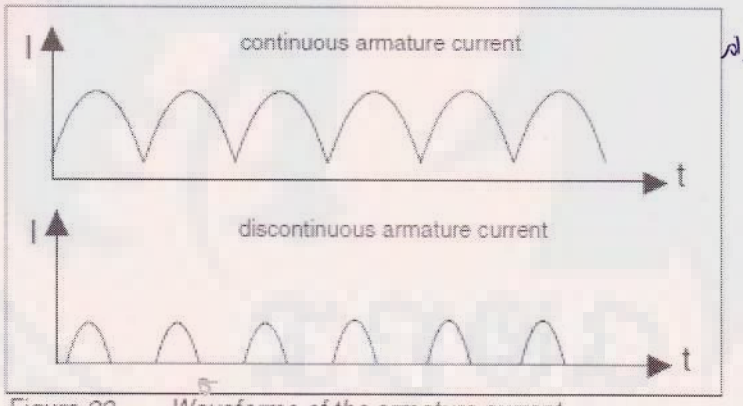


Figure 22 *Waveforms of the armature current*

Field Reversal

Field reversal is needed when the drive has only one armature bridge (two-quadrant). This gives the possibility to change the speed direction and also to regenerate the energy back to the network. The sign of the torque reference in armature control defines the direction of the field.

يعني عكس الـ field أو المجال لاحداث عكس للحركة ينتج عنه مرحلة وطاقة تعود للـ Drive

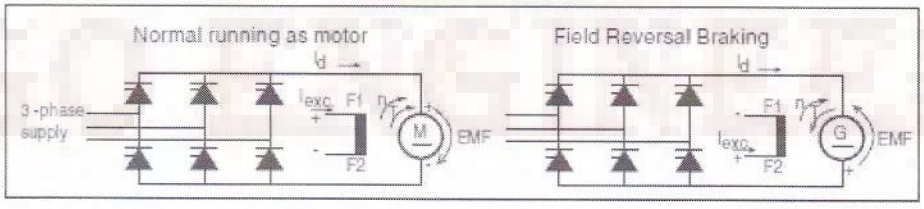
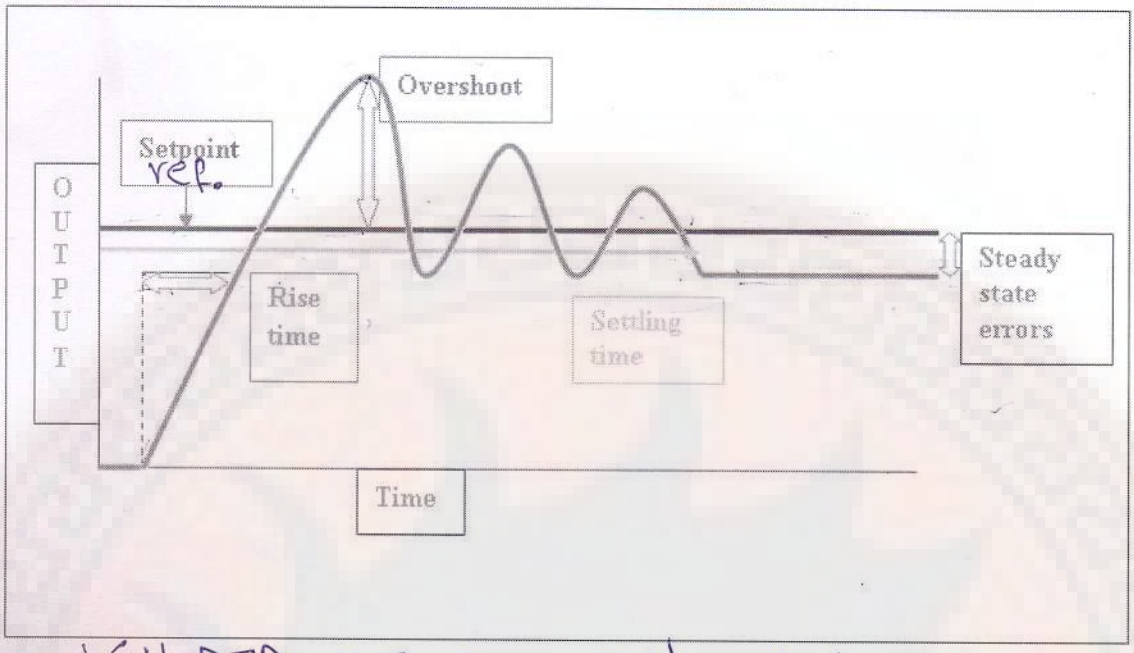
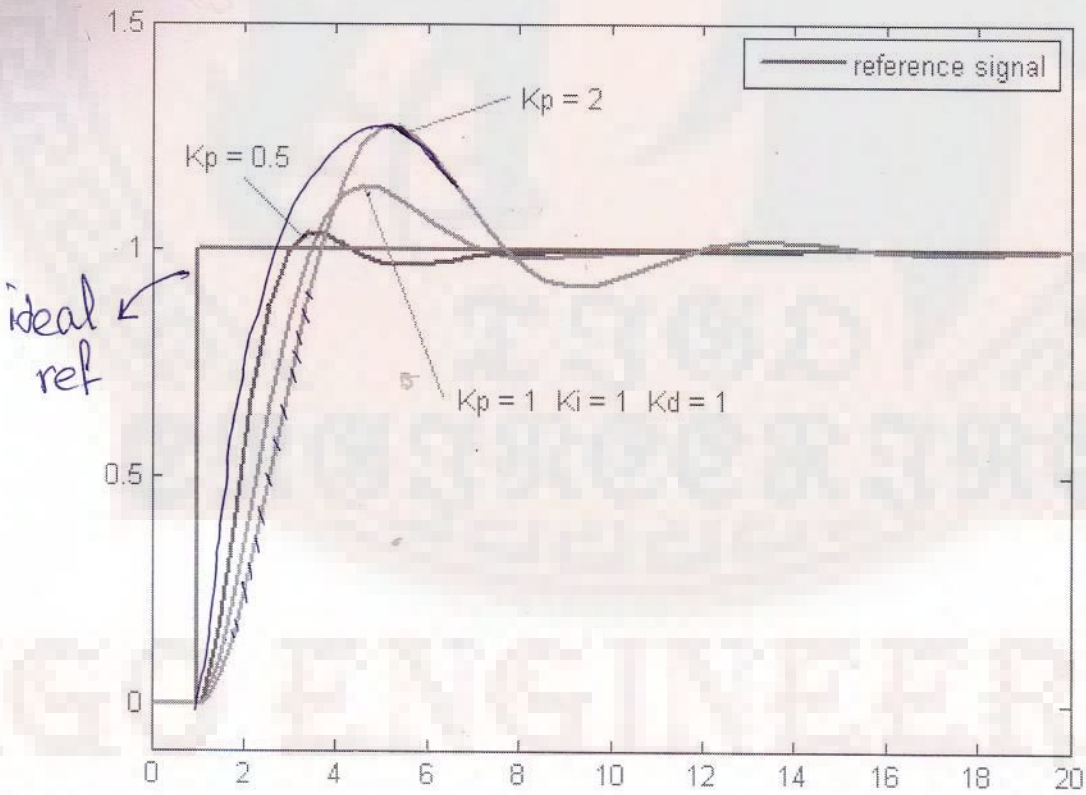


Figure 41 *Field reversal braking principle*

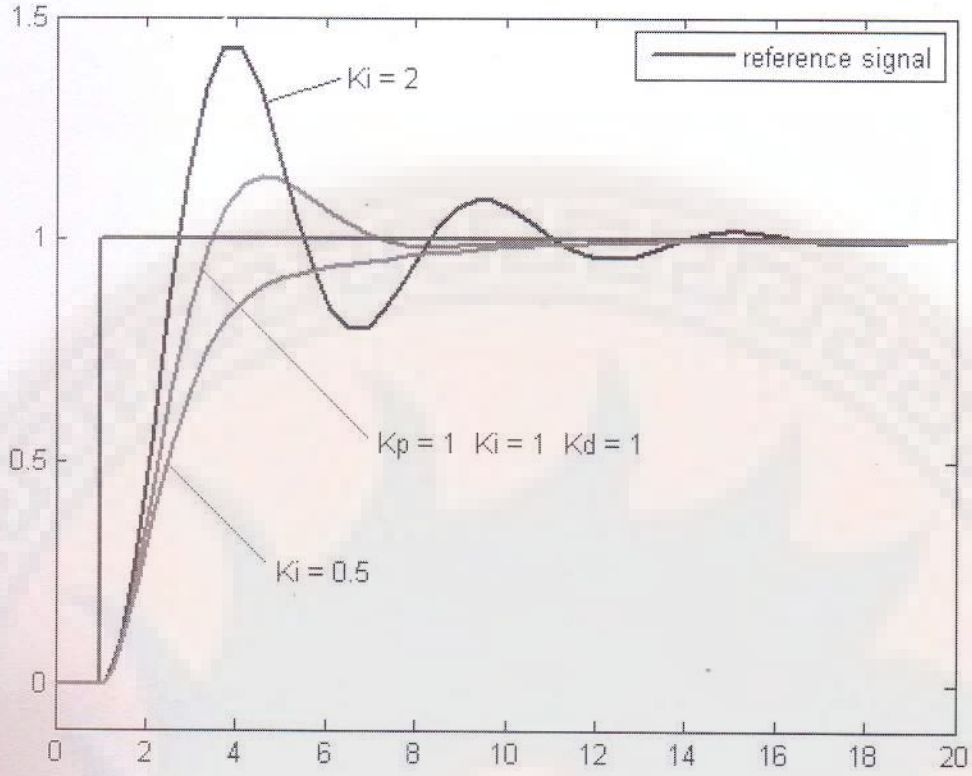


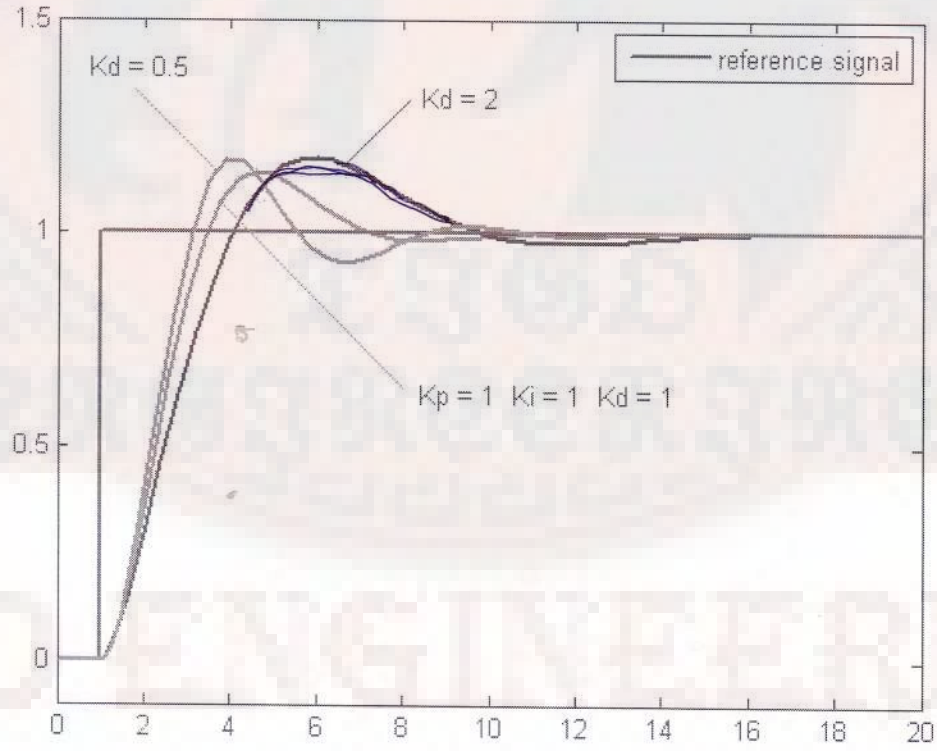
تعريف المصطلحات التي يقوم PID بالتغير فيها



التغير من Kp او gain او propotional

Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674





لا تنسونا من صالح الدعاء Eng.\ Ahmed Taghyan
EGYPTIAN STEEL
eng.ahmed.taghyan@gmail.com 01289000674

Trends 1

Print ADMINISTRATOR

3:18:06 PM
12/17/2015

Data Set | Recipe | Overview | Pumps | Ready | Trends | Alarms | Utilities

BILLET LAMINATED SHIFT 1	BILLET LAMINATED SHIFT 2	BILLET LAMINATED SHIFT 3
134	007	136

Home

PLC COMUNICATION
Rolling Mill 009 ms | Service 063 ms

0.00 0.00 Pen Off Select

Motor 1 Actual Speed RPM
1253.00 1247.00 Pen Off Select

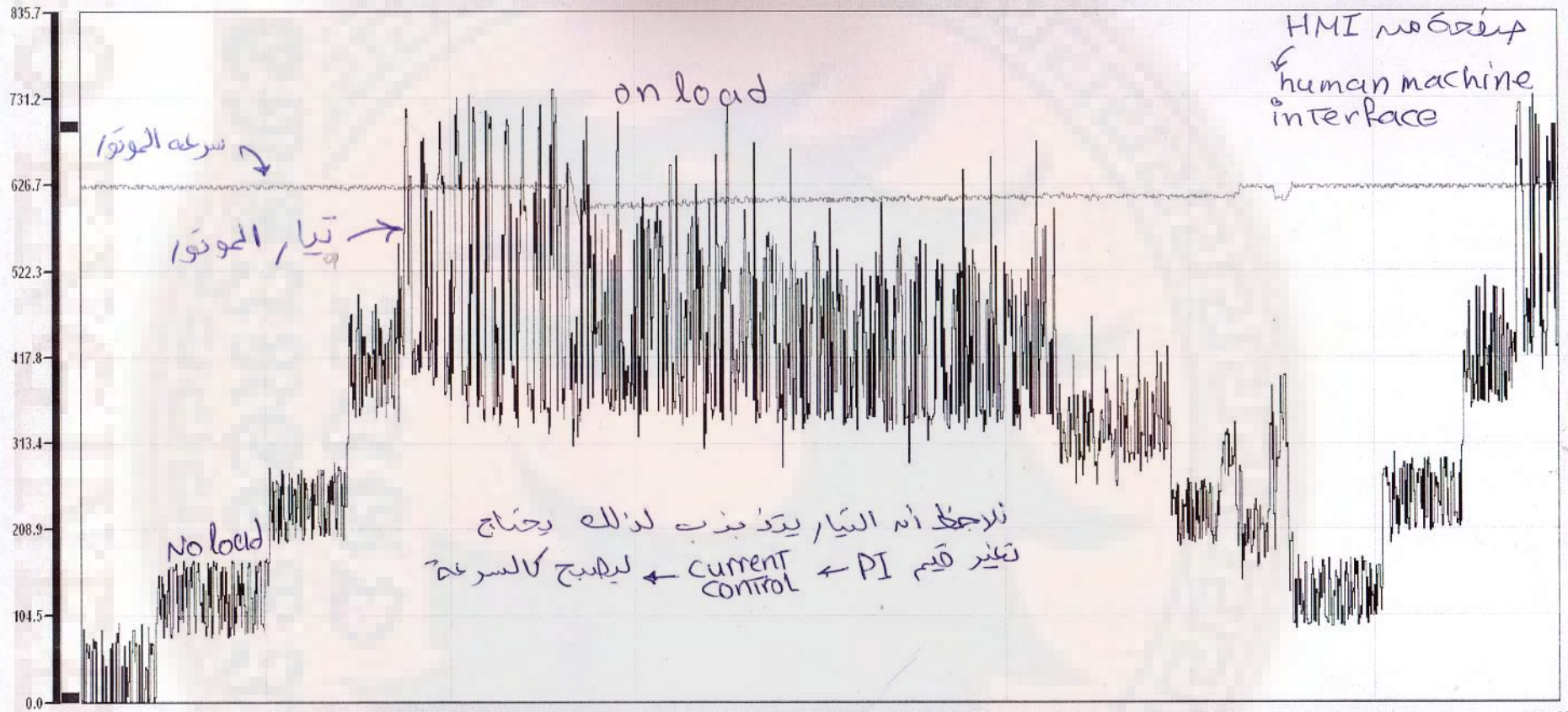
0.00 0.00 Pen Off Select

0.00 0.00 Pen Off Select

0.00 0.00 Pen Off Select

0.00 0.00 Pen Off Select

Motor 1 Actual Current A
2.00 433.00 Pen Off Select



14:53:56

14:57:35

◀◀ ◀ Actual ▶ ▶▶

Zoom In | 3m 39s | Zoom Out

1 minute	1 hour	1 day
10 minute	5 hours	7 days
30 minute	10 hours	15 days

Recipe On HMI : Rebar 22m.m 17.12.2015 Sh B
Recipe On PLC:

17/12/15 13:43:47 RM254- ST 13-14 armature over current

READY

ARM_CURR_PI_KP
Parameter of CURRENT CONTROL-function block. (S7/16)
Proportional gain for PI-type current controller:
output = ARM_CURR_PI_KP * error / 256.

407	FB_P: I2	SC: -	HL: 2977	LL: 3	D: 300	U: -

ARM_CURR_PI_KI
Parameter of CURRENT CONTROL-function block. (S7/16)
Integration gain for PI-type current controller:
Time constant = 16384 * 3,33 / ARM_CURR_PI_KI (50 Hz supply)
16384 * 2,77 / ARM_CURR_PI_KI (60 Hz supply).

408	FB_P: I2	SC: -	HL: 31968	LL: 0	D: 3200	U: -

U_MOTN_V
Parameter of SETTINGS-function block (S2/16 I mod in S21.232)
The nominal voltage of the motor in volts. (higher HL in S21.232)

501	FB_P: I2	SC: 1	HL: 1800	LL: 0	D: 0	U: V

I_MOTN_A
Parameter of SETTINGS-function block. (S2/16)
The nominal current of the motor in amperes is set by this parameter for 6 pulse drives.
Half of the nominal current of the motor in A is set by this parameter for 12 pulse drives!
Notice that when this value is changed, all motor current parameters and signals will have different values when they are shown in [A] in the panel or in CMT/DCS 500:
ARM_CURR_REF_SLP, CURRENT_RISE_MAX, MODEL1.CURR, MODEL2.CURR, ARM_CURR_LIM_P, ARM_CURR_LIM_N, MAX_CURR_LIM_N1-5, ARM_CURR_REF, ARM_CURR_ACT, REF_DCF, CURR_LIM_P, CURR_LIM_N, Arm.Curr.Slave, Arm.CURR.Both, Curr.-Ref.1, Curr.-Ref.2.

502	FB_P: I2	SC: 1	HL: 10000	LL: 0	D: 0	U: A

I_MOT1_FIELDN_A
Parameter of SETTINGS-function block (S2/16 I mod in S21.232)
The nominal field current of motor 1 in 0.01 Amperes. (lower HL in S21.232)
Notice that when this value is changed, all motor 1 field current parameters and signals will have different values when they are shown in [A] in the panel or in CMT/DCS 500:
F1_CURR_GT_MIN_L, F1_OVERCURR_L, F1_RED.REF, OPTI.REF_MIN_L, REV.REV_HYST, F1_CURR_REF, F1_CURR_ACT.

503	FB_P: I2	SC: 0.01	HL: 16380	LL: 0	D: 30	U: A

511	FB_P: I2	SC: 1	HL: 150	LL: 20	D: 110	U: %

ARM_OVERCURR_LEV
Parameter of CONVERTER_PROTECTION-function block. (S9/16)
Armature overcurrent tripping level in % of converter nominal current.

512	FB_P: I2	SC: 1	HL: 230	LL: 20	D: 230	U: %

[ACK_CONV_FAN]
Input of DRIVE LOGIC-function block. (S3/16)
An acknowledge signal from converter fan contactor. The drive will not start if there is no acknowledge from the converter fan contactor after the FAN_ON (10908)-command.

910	FB_I: C4	SC: BI	HL: 19999	LL: 0	D: 10701	U: -

[ACK_MOTOR_FAN]
Input of DRIVE LOGIC-function block. (S3/16)
An acknowledge signal from motor fan contactor. The drive will not start if there is no acknowledge from the motor fan contactor after the FAN_ON (10908)-command.

911	FB_I: C4	SC: BI	HL: 19999	LL: 0	D: 10703	U: -

DRIVEMODE
Parameter of MAINTENANCE-function block. (S2/16)

This parameter is used to start special drive functions like autotuning for controllers. After the drive function has completed DRIVEMODE changes to value 0. If an error occurs during drive function, DRIVEMODE is set to value 12. The reason for the error can be seen from the signal COMMIS_STAT1 (11201).
Following drive functions are available:

0 = NOT ACTIVATED	(No function is active)
1 = CLEAR FAULT LOGG.	(Clear the contents of Fault Logger)
2 = CALC PROGRAM LOAD	(Calculate the processor load)
3 = ARM. AUTOTUNING	(Autotuning of armature current controller)
4 = ARM. MAN. TUNING	(Manual tuning of armature current controller)
5 = FEX2/3 AUTOTUNING	(Autotuning of the first field exciter
6 = MOT2 FEXC AUTOTUN	(Autotuning of the second field exciter
7 = FEXC2/3 MAN.TUNIN	(Manual tuning of the first field exciter)
8 = MOT2 FEXC MAN.TUN	(Manual tuning of the second field exciter)
9 = SPD LOOP MAN.TUN	(Manual tuning of the speed loop)
10 = EMF CNTR MAN.TUN	(Manual tuning of EMF controller

Following value is shown during PROGRAM_LOAD-function:
11 = WAIT A MOMENT...

Following value is shown if autotuning fails:
12 = FAILED, SEE 112-01

1201	FB_P: E2	SC: -	HL: 10	LL: 0	D: 0	U: -

حالة الطبيعية
عند كتابة "1" يمسح كل الـ Fault التي حدثت
يقوم بعمل Auto Tune للـ Current control
يقوم بعمل Auto Tune للـ Field exciter وينتج عن ذلك تغير الموتور لاختلاف قيمة مقاومة الـ field للموتور الجديد

ACCEL1
Parameter of RAMP GENERATOR-function block. (S4/16)
The time in which the drive will accelerate from zero speed to nominal speed.

1708	FB_P: I2	SC: 0.1	HL: 30000	LL: 1	D: 200	U: s

DECEL1
Parameter of RAMP GENERATOR-function block. (S4/16)
The time in which the drive will decelerate from nominal speed to zero speed.

1709	FB_P: I2	SC: 0.1	HL: 30000	LL: 1	D: 200	U: s

التسارع ويكون بالوقت "s" الوقت الذي يستغرقه الـ Drive للصعود من zero لسرعة أعلى أو من سرعة أقل لسرعة أعلى

التباطؤ "s" الوقت الذي يستغرقه الـ Drive للنزول من سرعة أعلى لسرعة أقل أو zero

SPEEDMAX
Parameter of RAMP GENERATOR-function block. أعلى قيمة للسرعة (S4/16)
Positive limit for speed reference.

1715	FB_P: I2	SC: SPEED	HL: 30000	LL: 0	D: 20000	U: rpm

SPEEDMIN
Parameter of RAMP GENERATOR-function block. أقل قيمة للسرعة (S4/16)
Negative limit for speed reference.

1716	FB_P: I2	SC: SPEED	HL: 0	LL: -30000	D: -20000	U: rpm

SPC.KP
Parameter of SPEED_CONTROL-function block. (S5/16)
The proportional gain of the speed controller. SPC.KP = 100 => gain = 1.

2014	FB_P: I2	SC: 1	HL: 32000	LL: 0	D: 500	U: %

Kp "%" بتاع السرعة speed control

SPC.KI
Parameter of SPEED_CONTROL-function block. (S5/16)
Integral action time of the controller.

2018	FB_P: I2	SC: 1	HL: 32000	LL: 0	D: 5000	U: ms

KI "ms" بتاع السرعة speed control

FIELDBUS_PAR.1
Parameter of FIELDBUS-function block. (S12/16).
Selects the fieldbus-adapter.
0 = DISABLE
1 = Fieldbus
2 = Advant / DDCS
3 = MODBUS INTERNAL
4 = RESET fieldb. par.
If **Fieldbus** is selected the following fieldbus adapters are supported:

PROFIBUS	adapter NPBA-02
PROFIBUS	adapter NPBA-12
AC31(CS31)	adapter NCSA-01
MODBUS	adapter NMBA-01
MODBUS+	adapter NMBP-01
CANopen	adapter NCAN-02
DeviceNet	adapter NDNA-02

4001	FB_P: E2	SC: 1	HL: 4	LL: 0	D: 0	U: -

ضع الرقم المختار ثم اضغط Enter

نوع اتصال الـ Drive بالشبكة عن طريق Fieldbus

عند اختيار "4" يقوم بعمل reset للاتصال ويفضل عملها في حالة التهنيج

I_TRIP_A
Signal of SETTINGS-function block. (S2/16)
Converter rating plate value. Overcurrent tripping limit of the converter. (see additional information at I_CONV_A)

10510	FB_O: I2	SC: 1	HL: -	LL: -	D: -	U: A

ARM_CURR_ACT
Signal of SETTINGS-function block. (S2/16)
Actual current of the motor. Scaling based on parameter I_MOTN_A (502)

10502	FB_O: I2	SC:MCURR	HL: -	LL: -	D: -	U: A

TORQUE_ACT
Signal of SETTINGS-function block. (S2/16)
Actual torque of the motor. 100 % = nominal torque of motor.

10503	FB_O: I2	SC: TORQ	HL: -	LL: -	D: -	U: %

U_NET_ACT
Signal of SETTINGS-function block. (S2/16)
Actual voltage of the net supply. Scaling based on parameter U_SUPPLY (507)

10504	FB_O: I2	SC: VOLT	HL: -	LL: -	D: -	U: V

U_ARM_ACT
Signal of SETTINGS-function block. (S2/16)
Actual voltage of the motor. Scaling based on signal U_NET_DC_NOM

10505	FB_O: I2	SC: VOLT	HL: -	LL: -	D: -	U: V

QUADR_TYPE
Signal of SETTINGS-function block. (S2/16)
Converter rating plate value (number of quadrants):
1 = (one quadrant)
4 = (four quadrant)
(see additional information at I_CONV_A)

10514	FB_O: I2	SC: -	HL: -	LL: -	D: -	U: -

BACKUPSTOREMODE
Signal of MAINTENANCE function.
BACKUPSTOREMODE is used to give commands to parameter handling function in the drive:

0 = NONE
1 = SAVE MOT1 SET — Save motor set 1
2 = SAVE MOT2 SET — Save motor set 2
3 = FACTORY SET VAL. — Load factory values
4 = SELECT MOT1 SET — Load motor set 1
5 = SELECT MOT2 SET — Load motor set 2
6 = READ APPL BLOCKS — Load application; if additional function blocks are activated and saved via SAVE MOTx SET and modified afterwards without saving the configuration before the last modification (the one directly after the last SAVE action) can be activated

While the command is executing the value of BACKUPSTOREMODE will show what is happening or the reason for error if the command fails:

7 = ERASE ERROR — Error during erasing of parameter flash
8 = ERASING... — Erasing the parameter flash
9 = PROGRAM ERROR — Error during programing of parameter flash
10 = PROGRAMMING... — Programing the parameter flash
11 = WRONG FLASH TYPE — Verification error
12 = READING... — Reading the parameter flash
13 = READ ERROR — Error during reading of parameter flash
14 = reserved
15 = VERSION ERROR — Bad type of parameter flash
16 = reserved
17 = SIZE ERROR — Bad size of parameter flash

11202	S: E2	SC: -	HL: 5	LL: 1	D: -	U: -

CURR_LIM_P
Signal of TORQUE/CURRENT LIMITATION-function block. (S6/16)
Positive current limit for current contoller.

12307	FB_O: I2	SC:MCURR	HL: -	LL: -	D: -	U: A

CURR_LIM_N
Signal of TORQUE/CURRENT LIMITATION-function block. (S6/16)
Negative current limit for current contoller.

12308	FB_O: I2	SC:MCURR	HL: -	LL: -	D: -	U: A

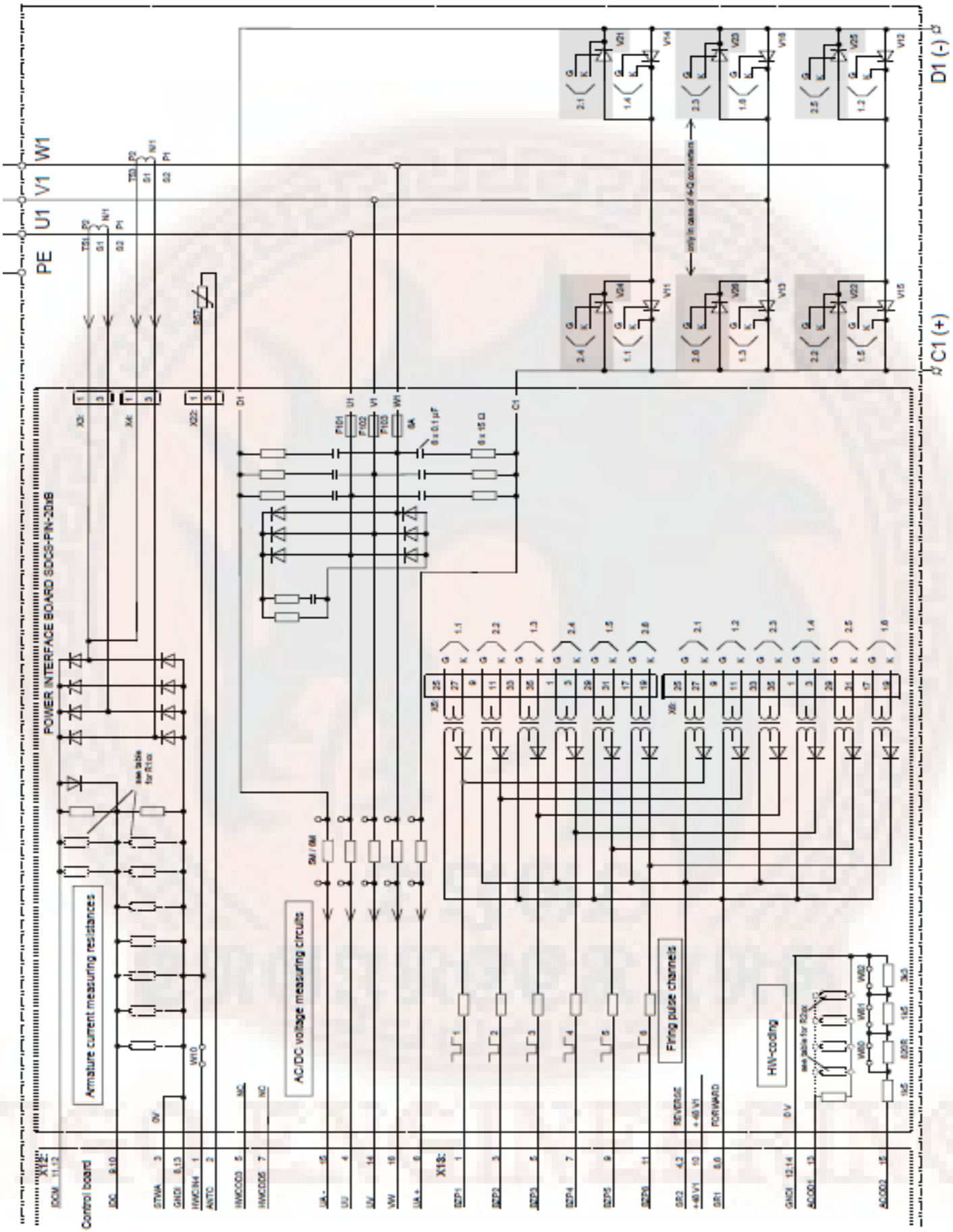


Fig. 5.2/2 Typical armature circuit thyristor converter diagram with SDCS-PIN-20B board for a 2Q/4Q C1/C2 type converter

الرسمة الكاملة للدريف بجميع الدوائر