



DEPARTMENT OF

ELECTRICAL AND ELECTRONICS ENGINEERING

NAME OF THE RESEARCH CENTER :

SIEMENS DCS COMOS INTEGRATED ENGINEERING



PREPARED BY: Mr. S.PRAKASH, M.E Assistant Professor (Gr -II) لمستعلمت ل EDITED BY:

Dr.L.CHITRA Professor & HOD

PREFACE

This Research center manual for Siemens DCS COMOS Integrated Engineering has been revised and updated in order to meet the Curriculum changes, laboratory equipment upgrading and the latest simulation.

Every effort has been made to correct all the known errors, but nobody is perfect, if you find any additional errors or anything else you think is an error, Please feel free to inform the HOD / EEE at eeedept@avit.ac.in

The Authors thanked all the staff members from the department for their valuable Suggestions and contributions.

The Authors Department of EEE

DCS MANUAL

Siemens DCS System with safety I/O station

Modular systems AS 410-5H and AS 410E - Overview

With the rugged all-round AS 410 system, the SIMATIC PCS 7 process control system offers an exclusive automation system from the SIMATIC S7-400 series, which can be used in all domains due to its versatility.

The rugged AS 410 is a modern, future-oriented, all-round system for the process industry. Its versatility means it can be used in all areas – as a standard AS 410S system, as a high-availability AS 410H or as safety-related AS 410F/FH. More and more innovative functions are being exclusively combined with this automation system, for example redundant PROFINET configurations and configuration changes during operation for PROFINET in singular and redundant applications

With its high-performance hardware and optimized firmware, the innovative CPU 410-5H Process Automation of the AS 410 covers the entire performance range of conventional AS 412 to AS 417 automation systems. Its automation performance can be scaled with system expansion cards based on the number of SIMATIC PCS 7 process objects (POs).

Flexible and scalable availability

A particular characteristic of the modular S7-400 systems is the flexible and scalable availability of various components. For a SIMATIC PCS 7 AS Single Station of the AS 410 type, you have the option of specifically increasing the availability by implementing a redundant configuration of the power supply or the Industrial Ethernet communications module, and combining these measures.

Even the AS Redundancy Station of the AS 410 type with its redundant CPUs offers significantly higher availability. It operates according to the 1002 principle, in which a switch is made from the active subsystem to the standby system in the event of a fault. Starting from here, you can double the power supply or the Industrial Ethernet communications module for each subsystem, and combine these measures.



As shown in the figure, CPU 410-5H Process Automation is equipped with two PROFINET IO interfaces (2-port switch in each case) for up to 250 I/O devices and a PROFIBUS DP interface for up to 96 PROFIBUS DP slaves. Two integrated slots allow the synchronization of two redundant subsystems via sync modules and sync cables (FOC).

Features:

- Integrated 48 MB load memory and 32 MB RAM each for program and data
- Cycle time up to 10 ms/9 process tasks
- Total number of I/Os (on PROFIBUS DP and PROFINET IO) approx. 7 500, 16 KB each for inputs and outputs
- Additional protection of the circuit board with coating (conformal coating)
- Expanded temperature range during operation up to 70 °C (as of product version 2)
- High-precision time stamping
- Recessed RESET button
- Preset hardware parameters (PCS 7 skinning)
- Changes in the type of module during operation (TCiR) in association with the SIMATIC PCS 7 Engineering System V8.1 and higher

ET 200iSP - Distributed I/O for hazardous areas

The SIMATIC ET 200iSP distributed I/O system is the economical solution for areas subject to explosion hazards. The intrinsically safe, modular I/O station is particularly flexible and requires minimum engineering, installation and cabling overhead.



Area of application

The SIMATIC ET 200iSP is typically used in production facilities of the process industry and offers optimum integration into PCS 7 and other control systems. The intrinsically safe I/O system is suited for direct installation in areas subject to gas or dust explosion hazards, i.e. in Zone 1 and 2 as well as in Zones 21 and 22; sensors and actuators may be located directly in Zones 0 and 20.

Benefits

- Individual configuration and flexible expansion thanks to modularity
- Module replacement during operation (hot swapping) and Configuration in Run possible
- Connection of signals to HART standard without any restrictions in functionality
- Comprehensive diagnostic options simplify commissioning and troubleshooting
- Condensation-resistant modules in a temperature range from -20° to $+70^{\circ}$
- Full PROFIBUS and power supply redundancy

Working Procedure:

Double Click on Simatic Manager icon on the Desktop



PCS7 v9.0 Sp1 Software will open



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To insert your Controller, right click on work area and select **insert new Object**" \rightarrow Simatic 400 Station.



Now a Simatic 400 icon will be created and now double click that icon.



Now click on **Hardware** icon to go to hardware configuration window

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Now to configure your controlled module, Go to Simatic 400 folder on Catalog tab. Select **Rack** $400 \rightarrow$ Drag and drop **UR2ALU** coated module.



Now a 9 slot rack will be on the work area with the name (0)



Select the Power module PS 407 10A Coated in the slot 1.



Now select CPU 410E v8.2 from the folder CPU-400



Once you drag and drop the CPU, it will ask for the Interface address **X5**. Set the IP Address as **192.168.1.1** and click on **New**.

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To select the Remote I/O station, go to **Profibus DP** \rightarrow **ET200iSP** \rightarrow **IM152-1** (second one) and drag and drop to the Profibus network.

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Now select the other signal modules as in hardware.

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Select the Digital module in the same folder of the IM152-1.



Select the Analog module in the same folder of the IM152-1.



After selecting the module go to **main rack** and double click the **CPU410E**.

💐 HW Confi	ig - [SIMATIC 400(1) (Co	onfiguration) TRAIL]										- 6
Station	Edit Insert PLC Vi	iew Options Window Help	, ,									_ 8 ×
🗅 🥔 🔭	🖬 🎼 🎒 🗎 🗎	i 💼 🎰 🕕 📼 😤 😽	?									
-									*			
									-	Find		nt ni
E Contra										-		
	UNZALU									Profile:	PC\$7_V90	•
1	PS 407 10A									E B	FOUNDATION FIELDBUS	~
3	CPU 410E				PF	OFIBUS(1): D	P master system (1)			P 📅	PROFIBUS DP	
										II	Closed-Loop Controller	
X1	100						Table 152-1			Ē	DP/PA Link	
IF1							CHINE			Ð	ET 2006	
X5	PN-10-X5			-							ET 2005P	
X5 P	1 R Port 1										□	
X5 P	2R Port 2										ē 🚍 A	
XBP	1 R Port 1											
X8 P	2R Port 2				E	hemet(1): PRI	OFINET IO system (100)				4AI RTD	
1 5				-	_						E- 4 AJ 2WIRE HART	
											• 4 AI 2WIRE HART	E
A	LIR2ALLI										A AI 4WIRE HART	
		1	1	1	L		1.				H- 4 F-AI HART Ex	
Slot	Module	Order number	Firmware	MPI address	I address	Q address	Comment				⊟- <u></u> A0	
1	PS 407 10A	6E57 407-0KH02-0AA1			16383"						🕀 📲 4 AO HART	
3	S CPU 410E	6ES7 410-5HM08-0AB0	V8.2		<u> </u>						E- 4 AD HART	
	-											
X7	DP				16380*						🖮 🦲 DO	
IF1						<u> </u>					Standby module	
15	FN-10-X5				16382×						Watchdog module T 200M	
X5 P1 R	Port 1				16379*					ΠĒ	ET 200M	
X5P2R	Port 2				16378*	<u> </u>				Ē	ET 200pro	
X8P1R	Fait 1			-	16376*					Ð	ET 2005	
X8F2R	Port 2				16375*					E E	ET 200SP	
5										l ÷	FE Link	
6						<u> </u>				Ē	Network Components	
8				-	<u> </u>	<u> </u>				E B	Profile	
9										LL 🗄	SIMADYN	*
										6ES71	138-7FA00-0AB0	₹ <u></u>
										Analog with di	j input module, r-AI 4x0/420mA, HAHT, Exil, PHOFIsafe V2, safet agnostic interrupt. FW update	y-related,
1												
Press F1 to get	Help.											Chg
	a 🕋 🗖		220	17/54	And a	100	State State	the second second	100	7		12:51 PM
V	🗩 🔚 🕗			ALC: NOT	1.00	-	and the second second	and the second second				12/30/2018

Go to **Protection** Tab.

						~			1
						E	Eind		n
) UR2ALU							Profile:	PCS7_V90	
PS 407 10A	*						 ₩	FOUNDATION FIELDBUS	
CPU 410E			(Properties - CPU 410E -	R0/S3)		08	PROFIBUS DP	
		Γ		Tree of Day Internatio	L Curlo Istanuelo I. Discussifica Charle I. Particulina I. J. Parametera I.		E.	Closed-Loop Controller	
DP				General Startup	Cycle/Clock Memory Retentive Memory Memory Interrupts		÷.	DP/PA Link	
	=			Short Description:	CPULATOE			ET 2001S	
P1.R PN-10-X5			1	Short Descaption.	High availability and fail asfe canable: email controller for all branches of			⊞ 🍯 IM 152-1	
P2R Port 2					the process industry: performance corresponding to the System				
P1 R Port 1					to 2048 bytes IO); 9 process tasks, can be individually set as of 1 ms; +			4 AI TC	
P2R Part 2				Order No./ firmware:	6ES7 410-5HM08-0AB0 / V8.2	-		- 4AIRID 4AIRID	
			-	Name:	CPU-410E			E 4AI 2WIRE HART	
				Plant Designation:		_		E 4 AL 2WIRE HART	
)) UR2ALU				Lastin December				E 4AI 4WIRE HART	
Module Module	Order number	Firmware	MPI address	Location Designation.					
B PS 407 104	0E37 40/-0KH02-0PA1							B- 4AD HART	
S CPU 410E	6ES7 410-5HM08-0AB0	V8.2		Comment	I			CiR module	
DP								DI	
		-	-		1			Standby module	
FN-10-X5					-			Watchdog module T 200M	
Fait 1 Fait 2		-			-	_	œ.	ET 200PA SMART	
FN-10-X8				OK	Cannal Hata			ET 200pro ET 2005	
Port 1 Port 2		-		UK I		-	œ.	ET 2005P	
							E .	ET 200K	
								Network Components	
							E.	Profile SIMADYN	
						_	EEC712	29.7EA00.0AP0	
							Analogi	input module, F-AI 4x0/420mA, HART, Ex i, PROFIsafe V2, safety-re	elated,
							with diag	gnostic interrupt, FW update	

Click on Write Protection and set Password as "MIT@1234"

24.0	E Eind:
12ALU	
	Profile: PCS7 V90
PS 407 10A	E B FOUNDATION FIELDBUS
Properties - CPU 410E - (R0/S3)	E B PROFIBUS DP
	CIR-Object Gised-Loop Controller
DP Coerreal _ c	ns DP/PA Link
- Protection land	EI 2005
PAI/DAS PAI/DAS PAI/DAS C 1: Access protection for F CPU or keyswitch setting C 1: Access protection for F CPU or keyswitch setting	IM 152-1
7 Part 2 Can be bypassed web password	⊡ IM 152-1 ⊡-⊡ Al
PN/DX8 (© 2: Wite-protection	- 4AITC
7 Part 2 C 3: Read/write protection	4AIRTD 4AIRTD
Password:	+ 4AI 2WIRE HART
	€ 4 AI 2WIRE HART
Reente password:	4 AI 4WIRE HART
Module Order number Firmware MPI addres	⊖ <u>→</u> A0
For for the object with the deal	B- 4A0 HART
CPU 410E 6ES7 410-5HM08-0AB0 V8.2	- []] CIR module
DP Protect all CPU page large with the password for the safety program	
	Standby module
PM0/5	Watchdog module
And 1	ET 200PA SMART
PH/D/X8 Oxnoel Help	E 1 200pro
Avri	
	El 2008
	terminal Metwork Components
	Billion SimaDyn
	6ES7 138-7FA00-0AB0

For the configuration of Module, select **DI** module.

BU HR2ALU P5 407 10 A Port 10 F					
Build 22.4.0 P3 407 10A P3 407 10A PCD 410E PCD 410E 1 DP PROFIBUS(1). DP mader orden (1) PCD 410E PCD 410E 1 DP PROFIBUS(1). DP mader orden (1) PCD 410E PCD 410E 1 DP PROFIBUS(1). DP mader orden (1) PCD 410E PCD 410E 1 DP PROFIDUS DP PCD 410E PCD 410E 1 PROFIDUS DP PCD 410E PCD 410E PCD 410E 1 PROFIDUS DP PCD 410E PCD 410E PCD 410E 1 PROFIDUS DP PCD 410E PCD 410E PCD 410E 1 PROFIDUS DP PCD 410E PCD 410E PCD 410E 1 PROFIDUS DP PCD 410E PCD 410E PCD 410E 1 PCD 410E PCD 410E PCD 410E PCD 410E 1 PCD 410E PCD 410E PCD 410E PCD 410E 1 PCD 410E PCD 410E PCD 410E PCD 410E 1 PCD 410E PCD 410E PCD 410E PCD 410E 1 PCD 410E PCD 410E PCD 410E			_		Eind:
1 P 5 407 10 A 3 CPU 410E 1 DP D	(0) UR2ALU		_		Profile: PCS7_V90
B) M 152-1 Model Dide number I Addess Quidess Comment I Addess Quidess Comment I Addess Quidess Comment I Addess Addess I Addess <td< th=""><th>P3-607 P3-607 P3-607</th><th>00 00 00 00 00 00 00 00 00 00 00 00 00</th><th></th><th></th><th>PROFIBUS(1): DP matter system (1) PROFIBUS(1): DP matter system (1) PROFILUS (2): DP matter system (</th></td<>	P3-607 P3-607	00 00 00 00 00 00 00 00 00 00 00 00 00			PROFIBUS(1): DP matter system (1) PROFIBUS(1): DP matter system (1) PROFILUS (2): DP matter system (
BOTHWARDIN EEX7139/PRODUCED L2 Image: Control of the	(3) IM 152-1 Module	Order number 6ES7 152-14400-0480	1 Address 16373*	Q Address	Convert Con
4 AO HART 6ES7 135-7T.D00-0A80 512519	8 F-DI NAMUR, Ex 4 F-DO 40mA, Ex 4 AI 2WIRE HART	6ES7 138-7FN000480 6ES7 138-7FN00-0480 6ES7 138-7FD00-0480 6ES7 134-7TD00-0480	38 913 512519	36 913	■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■ ■
4 F-AI HART, Ex 6ES7 138-7FA00-0A80 520531 520523 Polle Polle 4 F-AI HART, Ex 6ES7 138-7FA00-0A80 520531 520523 Polle Polle	4 AO HART	6ES7 135-7TD00-0AB0		512519	
	4 F-AI HART, Ex	6ES7 138-7FA00-0AB0	520531	520523	Porte Porte SMADYN

Once you double click on DI module, go to **parameter** tab

_	E End:
(0) UR2ALU	Profile: PCS7_V90
1 PS 407 10A	TOUNDATION FIELDBUS
3 CPU 410E Properties - 8 DI NAMUR - (R-/S4)	
General Addresses Identification	meters
F1 E Chat Device and D	DP/PA Link
IF2 Short Description. 6 UT NA	ET 2006P
X5 P1R Pot 1	Bring and Min 152-1
X5 P2 R Pot 2	
X8 P/N-0-X8 X8 P1 R Pot 1 Order No: 6ES7 13	D-0AB0
X8 P2 R Port 2 Name SOLUM	- 4AIRTO
# #	B 4 AJ 2WIRE HART
	E 4 AI ZWIRE HART
(3) IM 152-1	🕀 👖 4 AI 4WIRE HART
Module Order number I Address Q Address	🕀 🗍 4F-4J HART, Ex
M152.1 6ES7.152.1AA00.0480 16973*	🔁 🗍 🗄 🗍 🗛 🗛 🗛 🗛 🗛
Comment:	E 440 HART
8 DI NAMUR 6ES7 131-7RF00-0A80 0.2	r ⊕ ⊡ DI
4 F-00 40mA, Ex 6ES7 138-7F000-0480 913 913	⊕ D0
4 AI 2WIRE HART 6ES7 134-7TD00-0AB0 512519	Vatchdog module
	⊕ 🛄 ET 200M
	E E ZOPA SMART
A 40 HABT SEST 135-71000-0480 512 519 OK	Cancel Help 🕀 🧰 ET 200S
	🗄 🧰 ET 2005P
	E 🔤 Cristov
	Retwork Components
4 F-AI HART, Ex 6ES7 138-7FA00-0AB0 520531 520523	B IMADYN
	EEST 139.7EAND.0ARD
	Analog input module, F-AI 4x0/420mA, HART, Ex i, PROFIsafe V2, safety-related,
	* with diagnostic interrupt, HW update
to get Help	1

Select input \rightarrow Channel 0

				E End
(0) UR2ALU				Profile: PCS7_V90
1 PS 407 10A				
		Properties - 8 DI NAMUR - (R-/S4)	×	PROFIBUS DP
				CIR-Object
X1 DP		General Addresses Identification Parameters		B DP/PA Link
IF1 ====================================		Parameters	Value	⊕ 🔁 ET 200IS
X5 PN-IO-X5		🖃 🔄 Parameters		ET 200/SP
X5P1R Port 1		Time-of-Day Stamp		E- IM 152-1
X5 P2 R Port 2		Data format	57	E-CAL
X8 P1 R Port 1		Configuration		- 4AITC
X8 P2 R Port 2		E Channel 0		44IBTD
ξ. Ψ.		Channel 1		⊕ 4 AI 2WIRE HART
		Channel 2		Image: Image
(3) IM 152-1		🕀 🧰 Channel 4		A AI 4WIRE HART
ar Brunn Ion Ion		Channel 5		⊕ 4 F-ALHART, Ex
Module Urder number 17	Address U Address	Channel 5		e 😐 A0
M152-1 6ES7 152-1AA00-0AB0 16	S273*	Charles P		E 4AD HART
				- TT CR module
8 EDI NAMUH 6ES7 131-/HF00-0480 0.	2 2 6			🕀 🍎 DI
4 F-D0 40mA, Ex 6ES7 138-7FD00-0AB0 9	13 913			E DO
4 AI 2WIRE HART 6ES7 134-7TD00-0AB0 51	2519			Watchdog module
				⊞- 🛄 ET 200M
				ET 200PA SMART
		ОК	Cancel Help	ET 200pro
4 AO HART 6ES7 135-7TD00-0AB0	512519			ET 2005P
				ET 200×
3				- Profile
4 F-AI HART, Ex 6ES7 138-7FA00-0AB0 52	0531 520523			- BIMADYN
				6ES7 138-7FA00-0AB0
				Analog input module, F-AI 4x0/420mA, HART, Ex i, PROFIsafe V2, safety-related
				with diagnostic interrupt, PW update

Select Sensor Type as Single contact unwired



						-			
							Find	[
mm 11824111								1	
	1104					1	Profile:	PCs7_V90	
I PS 40/	TUA .	â l			×			DUNDATION FIELDBUS BOFIBLIS DP	
3 CPU 4	110E			Properties - 8 DI NAMUR - (R-/S4)	~		1 3	CIR-Object	
X1 DP				General Addresses Identification Parameters				Closed-Loop Controller	
IF1		E		Paramatere	Value			ET 200is	
X5 PN-10-	X5			E Parameters	Talos		0	ET 200iSP	
X5P1R Port 1				Time-of-Day Stamp			E	IM 152-1	
X5 P2 R Port 2 X8 PN-IO-	X8			inputs —	\$7				
X8 P1 R Port 1				Configuration				- 4AIRTD	
X8 P2 R Port 2		-		Channel 0	DI	-		- 4 AI RTD	
	m		_	- I Sensor type	Single contact unwired			4 AI 2WIRE HART	
Los accesos				Diagnostic	Descharted			4 AI 4WIRE HART	
(3) IM 152-1				- Operating mode	Deactivated			4 AI 4WIRE HART	
Module	Order number	I Address	Q Address	Measuring window				E- III 4 F-AI HART, Ex E- III AD	
IM152-1	6ES7 152-14400-0480	16373*	-		DI			E 4 AO HART	
				E Sensor type	Single contact unwired			⊕	
8 DI NAMUR	6ES7 131-7RF00-0A80 6ES7 138-7EN00-0A80	3.8	3.6	Diagnostic Diagnostic	Deactivated			🖽 🦳 DI	
4 F-DO 40mA, Ex	6ES7 138-7FD00-0AB0	913	913	- Coperating mode		E		DO Standbu module	
4 AI 2WIRE HART	6ES7 134-7TD00-0AB0	512519		Measuring window				Watchdog module	
		-		Channel 3	-		P	ET 200M	
								ET 200pro	
4 AO HART	6ES7 135-7TD00-0AB0		512.519	OK	Cancel Help		œ•⊆	ET 200S	
			1			-	H-C	ET 2005P	
		-				-	œ 🖸	FF Link	
							B-C	Network Components	
4 F-AI HART, Ex	6ES7 138-7FA00-0AB0	520531	520523			_	÷.	SIMADYN	
	-					- 5	6ES7 138	-7FA00-0AB0	
						- 1	Analog inp	put module, F-AI 4x0/420mA, HART, Ex i, PROFIsafe V2, safety-re	lated,
		-				- *	with ulagri	usic menup, rw update	

Repeat the same for all Channels as we wired the Input as switches

Next Double click on **F DI** module

Bing Stat	ion <u>E</u> dit Insert <u>P</u> LC	View Options Window	v <u>H</u> elp			8,
	■··· 410 (C2) 4		64 R £		E Frd	= ⊒: nt n
!	(0) UR2ALU		_		Broke: PCS7_V30	
	1 PS 407 1 3 CPU 41	0E			(b) (c)	ľ
	X1 DP IF1 IF2 X5 P1 R Pnt-IO-X X5 P2 R Port 2	5	E			
	X8 P1 R X8 P1 R X8 P2 R 5 Port 2	g 			Ethemat(1) PROFINET IO system (100)	
+ =	(3) IM 152-1				B 4 A KVINE HART B 4 A KVINE HART B 4 A KVINE HART C 4 A KVINE HART	
Slot	Module	Order number	I Address	Q Address	Comment D AD AD	
2	IM152-1	6ES7 152-1AA00-04B0	16373"		D 4 AD HART	
3	8 DI NAMUR	6ESZ 131-78E00-0480	0.2			
5	8 F-DI NAMUR, Ex	6ES7 138-7FN00-0AB0	38	36		
6	4 F-DO 40mA, Ex	6ES7138-7FD00-0AB0	913	913	Standburgoduke	
7	4 AI 2WIRE HART	6ES7 134-7TD00-0AB0	512519		Watchdog module	
72					B 😑 ET 200M	
7.3						- U
7.4						
8	4 AO HART	6ES7 135-7TD00-0AB0	_	512519		
8.1						
83					E C FF Link	
8.4					B a Network Components	
9	4 F-AI HART, Ex	6ES7 138-7FA00-0AB0	520531	520523	The state of the s	
9.1			-			
9.2			-		6557138-7FA00-0480	ŧ
9.4			-		with diagnostic interrupt, PW 442044, PM 11, EX1, PHOP1ade V2, salely eladed, with diagnostic interrupt, PV update	
			-			
ess F1 t	o get Help.					Cł
		A STATE OF	the second se			and the second value of th

Go to **Parameter** → **F**-parameter

					Â	
_		_			E	End
(0) UR2ALU		_				Profile: PCS7_V90
1 PS 407	10A	<u>^</u>				FOUNDATION FIELDBUS
3 CPU 4	10E			Properties - 8 F-DI NAMUR, Ex - (R-/S5)	X	BOFIBUS DP CR-Object
-				General Addresses I Identification Parameters		E Cased-Loop Controller
X7 DP			_			B DP/PA Link
F2		-		Parameters	Value	ET 2005
X5 PN-10-2	5			Parameters Parameters	Safety mode	⊕ → IM 152-1
X5P2R Port 2				F-parameters	Juncy mode	E-
X8 PN-10-X	8			Module parameter		4AITC
X8 P1 R Port 1				Time-of-day stamp		- 4 AI RTD
5 POR 2		-			-	- 4AI RTD
	m		_			H 4 AL 2WIRE HART
L (2) 14 162 1						4 AI 4WIRE HART
[3] IM 152-1						A J 4VIRE HART
Module	Order number	I Address	Q Address			
IM152-1	6ES7 152-14400-0480	16373*			E I	E- 4AD HART
						E 4AU HAHI
8 DI NAMUR	6ES7 131-7RF00-0AB0	02	2.6			DI DI
4 F-DO 40mA, Ex	6ES7 138-7FD00-0AB0	913	913			🕀 🧰 DO
4 AI 2WIRE HART	6ES7 134-7TD00-0AB0	512519				Watchdog module
		-				⊕ 🛄 ET 200M
		-				ET 200PA SMART
				ОК	Cancel Help	ET 2005
4 AU HART	6ES7135-71D00-0AB0	_	512519			B = ET 200SP
						ET 200X
						Metwork Components
A F-ALHART FY	6ES7 138-7EA00-0AR0	520 531	520 523			III III Profile
*********		01011001	OLOOLO			
						6ES7 138-7FA00-0AB0
						with diagnostic interrupt, FW update
		-	-			

Set the F_dest Address as 8



						<u> </u>
						End a
	7.104					Profile: PCS7_V90
U P3 40/	TOR.	â.			×)	FOUNDATION FIELDBUS
3 CPU 4	10E			Properties - 8 F-DI NAMUR, Ex - (R-/S5)		GR-Object
a DP			_	General Addresses Identification Parameters		Closed-Loop Controller DP/PA Link
F1		Ξ		Parameters	Value ^	ET 2006
5 PN-10-	X5			F_source_address	1: CPU 410E	B I 2005P
SPIR Port 1 SP2R Port 2				- W P_dest_address - W DIP switch setting (90)	8 0000001000	E IM 152-1
18 PN-IO-	XB			E F monitoring time (ms)	2500	
(8 P1 R Part 1				Module parameter	supported by channels	- 4 AI RTD
POT 2		-		- Maximum test time (s)	1000	- 4 AI RTD
				Channel 0, 4	Test estation	A AI 2WIRE HART
(3) IM 152-1				Evaluation of the sensors Evaluation of the sensors Evaluation of the sensors		A AI 4WIRE HART
	la.	i		- Behavior at discrepancy		4 AI 4WIHE HART
Module	Urder number	1 Address	U Address	Discrepancy time (ms) El Reintegration after discrepancy error		e 😑 🧛
IM152-1	6ES7 152-1A400-0480	16373*		—		
8 DI NAMUR	6ES7 131-78E00-0480	0.2		Channel 0	NAMUE sensor	- []] CiR module
B F-DI NAMUR, Ex	6ES7 138-7FN00-0AB0	38	36	- Input delay	Channel disabled	
4 F-D0 40mA, Ex	6ES7 138-7FD00-0AB0	913	913	Sensor supply test	NAMUR sensor Single contact not wired	Standby module
A AI 2WINE HANT	6C37134-71000-0460	512513		Pulse extension	Single contact with 10 kOhm parallel resistance	e Watchdog module
				Channel 4	Single contact with 1 Komin series resistance	E 1 200M
					Conset Units	ET 200pro
4 AO HART	6ES7 135-7TD00-0AB0		512519		Canicer	ET 2005
		-				⊕
						FF Link Free Network Components
	CEC 7 120 7EA00 0AD0	E20 E21	E20 E22			🕀 🦲 Profile
41 MINANT, EX	0.37 130 77400 0480	520551	520			
		_				6ES7 138-7FA00-0AB0 Analog and modifie EAL4-0/4, 20mA MART, Ex. (PROEleste V2, estaburated
						with diagnostic interrupt, FW update
	1	-				

Go to Module Parameter \rightarrow Channel $0 \rightarrow$ Sensor Type as Single contact unwired

Repeat the steps for all the channel and select ok. Click **close**

前 HW Config - [3MATK 400(1) (Configuration) → TBAB] 前 Station Edit Inset FLC Syow Options Window Help □ Del Sea U And La A	
Image:	End
IF1 Image: Control of the	
(3) IM 1521 Star Module Older number I Address Message 1 AV557 AES71507A44(2)0480 76570 Generalization in the stop state of the AS. Dept Topologic 125721177) 3 AV1527 AES71307/PE00480 0.2 Generalization in the stop state of the AS. Generalization in the sto	B- 4 4 40/RE HART B- 4 4 40/RE HART B- 4 4 40/RE HART B- 4 40 HART, Ex A0 B- 4 40 HART B- 4 40
7 III 4 Al 2WIRE HART GES7 134-7/1000-00AB0 512519 71 73 74 <td></td>	
84 1 4 FAI HART, Ex. 6E 57 138-7FA00-0A80 520531 520523 91 9.2 9.3 9.3 9.3 9.3 9.3 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4 9.4	Chevel and the second sec

Now select **F_DO** module and double click

0 UR2AU 1 5 407 10 A 9 million Point PSC 7 1/00 A 3 0 UP 410E 9 million PSC 7 1/00 A Point PSC 7 1/00 A 3 0 UP 410E 9 million 0 UP 410E 9 million PSC 7 1/00 A 3 0 UP 410E 9 million 0 UP 410E 9 million PSC 7 1/00 A 9 million 9 million 3 0 UP 410E 9 million 0 UP 410E 9 million 9 million <th>- · · · · · · · · · · · · · · · · · · ·</th> <th>🙃 🛛 🏫 🏠 📼 🛛</th> <th>월 ₩?</th> <th></th> <th></th> <th></th>	- · · · · · · · · · · · · · · · · · · ·	🙃 🛛 🏫 🏠 📼 🛛	월 ₩?			
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Set the $F_$ dest address as 9 and click ok



Double click **AI** module

W Config - [SIMATIC 400 Station Edit Insert P)(1) (Configuration) TRAIL]	Helo			
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	and the second sec				

Go to **Parameter** \rightarrow **channel** $0 \rightarrow$ select measuring type as **Hart**. Select Remaining Channel as **Deactivated**.

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1 PS 40	7 10A					
2	1105			Properties - 4 AI 2WIRE HART - (R-/S7)	×	PROFIBUS OP
	THE			C IIIII IIII Burnetter		CiR-Object Ciosed-Loop Controller
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X5 P1 R Port 1	A9			- I Data format	57	B → M 152-1
X5 P2 R Port 2	¥2			Configuration		
X8 P1 R Port 1	no			- E Measuring type	HART	4 AJ TC
X8 P2 R Port 2		-		- E Measuring range	420mA -	- 4 AI RTD
2 1	m			- Smoothing	None	A AI 2WIRE HART
L (2) 14 152 1				Hardware interrupt High limit		E- 4 AI 4WIRE HART
(3) IM 152-1			-	E Low limit		⊕ I 4 AI 4V/IRE HART
Module	Order number	I Address	Q Address	Channel 1	Deactivated	₽- <u></u> 40
IM152-1	6E5.7 152-14400-04B0	16373*		- E Measuring range		E 4 AD HART
8 DI NAMUR	6ES7 131-78E00-0480	0.2		Diagnostic Smoothing		- CiR module
8 F-DI NAMUR, Ex	6ES7138-7FN00-0AB0	38	36	- Hardware interrupt		
4 F-D0 40mA, Ex	6ES7138-7FD00-0AB0 6ES7134-7TD00-0AB0	913	913	Low limit		Standby module
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4 AU HAHT	6E57135-71D00-0AB0	-	512519			⊞
						E C 2004
						Network Components
4 F-AI HART, Ex	6ES7 138-7FA00-0AB0	520531	520523			B SIMADYN
						6ES7 138-7FA00-0AB0
		_				Analog input module, F-AI 4x0/420mA, HART, Ex i, PROFIsafe V2, safety-related, with diagnostic interrupt, FW update
		-				

Now select AO module and select the Output type as I and select 0 .. 20mA for Channel 0.

Deactivate the other channel.

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Image: Constraint of the second sec	IAddess Q Address 76570° 0.2 36 36 9.1.3 9.13 512519 512519	PROFIBUS(1) DP mader endem (1) Properties - 4 A0 HART - (Rr/SS) General Addresses identification Parameters Parameters Configuration Channel 0 Channel 0 Channel 0 Channel 0 Channel 0 Channel 0 Channel 2 Chann	End An Ai End An Ai Dotker (PCS7_V30) TOTO TOUNDATION FIELDBUS TOTO TOUNDATION FIELDBUS TOT
91 4 F-AI HART, Ex 6ES7 138-7FA00-0A80 91 92 93 94	520531 520523		

Now select F_AI module and **uncheck** all the channel.

3 ■ CPU 410E X7 ■ DP #2 ■ PM-DX5 X877.R ■ PM-DX5 X872.R ■ PM-DX5 <th>m m 0rder number 6557 1557 1544/07/04/07 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400</th> <th>1 Address 76277* 0.2 3.6 9.13 512519</th> <th>Q Addess 3.6 9.13 512519</th> <th>PROFERENCY: DP made refeet (1) Properties of F-ATHART, Ex. (R-/S9) General Addresses Identification Parameters Using Parameters Deparating mode Deparating m</th> <th>P POINDATION FIELDBUS P POPERUS P POPERUS P</th> <th></th>	m m 0rder number 6557 1557 1544/07/04/07 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400 6557 1317/07/000-0400	1 Address 76277* 0.2 3.6 9.13 512519	Q Addess 3.6 9.13 512519	PROFERENCY: DP made refeet (1) Properties of F-ATHART, Ex. (R-/S9) General Addresses Identification Parameters Using Parameters Deparating mode Deparating m	P POINDATION FIELDBUS P POPERUS P POPERUS P	

After finished the Remote I/O configuration, Go to **Profibus DP** \rightarrow **DP/PA Link** \rightarrow **IM 153-2 HF OD** (6ES7-153-2BA70-0XB0). Drag and drop to Profibus network.



Set address as 4

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4	520531 520523	B SIMATIC PC Station EES7 153:2867/0404 EES7 153:2867/0404 Mit Sig UIDDOR), redundant interface module for PR0FBUS-PA. Reconfiguration Mang operation. Redundant, configurable interface module for attaching a non edundant PF0FBUS-PC Y = Y = Y
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HW Config - [SIMATIC 400(1) (Configuration) TRAIL] Station Edit Insert PLC View Ontions Window Help		
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1 PS 407 10A		Profile: PCS7_V90
3 CPU 410E	PROFIBUS(1): DP master system (1)	E TOUNDATION FIELDBUS
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X5 P2 R Port 2		in
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5	Define Master System	B- IM 153-2 HF OD B- IM 153-2 HF OD
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(3) IM 152-1		ET 200/SP ET 200/M
Iot Module Order number I Addr	ess Q Address Comment	ET 200PA SMART
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8 DI NAMUR 6ES7 131-7RF00-0AB0 02		ET 200SP ET 200K
8 F-DI NAMUR, Ex 6ES7 138-7FN00-0AB0 38 4 F-D0 40mA, Ex 6ES7 138-7FD00-0AB0 913	36	E FF Link
7 4 AI 2WIRE HART 6ES7 134-7TD00-0AB0 512	519	Network Lomponents Profile
12		
.3		SIMODRIVE
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3 4 F-AI HART, Ex 6ES7 138-7FA00-0AB0 520	531 520523	IMATIC 400 Image: SIMATIC PC Station
12		6ES7 153-28A70-0X80
13		IIM 153 (DUTDODP), redundant interface module for PROFIBUS-PA. Recordiguration – during operation. Redundantly configurable interface module for attaching a non redundant (PROFIBUS-DP ("Y link").
rtion possible		
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Select Interface module for Profibus-PA

To Select the DPT Transmitter, go to **Profibus PA** \rightarrow **Transmitter 1 Al**. drag and drop to Profibus PA network.

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1 PS 407 10A	= -			vi n
3 CPU 410E PROFIBUS(1): DP master system (1)	E	Profile:	Standard	•
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(4) IM 153-2, Redundancy				
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Set the address as **50** and click **ok**

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Now configuration hardware is finished.

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To create a symbolic names for input and outputs. Right the **DI** module and select **Edit symbol**.

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CPU 410E	Insert Multi-Controller Device	CUI+V	system (1)	Elone.		
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(3) IM 152-1	Specify Module					
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	Assign Asset ID					
4 F-ALHART Fx 6FS7 138-7FA00-0AR0	Product Support Information	Ctrl+F2				
	FAQs	Ctrl+F7				
	Find Manual	Ctrl+F6				

Create a name for inputs you are going to use in the program and click ok.

Repeat for all the module.

IM Config - ISMATIC 4000) (Configuration) - TRAI Station Edit Inset PLC View Options With Image: Station Edit Inset PLC View Options With V	1) dow Help J 2) 22 N/2 1 Address 0 Add 1 Address 0 Add 1 Address 0 Add 0.2 3 9.13 9.13 0.512519 0 512519	PROF8US(1): DP mader system (1) Frid Politic: Standad Image: Standard Standard POPBUS(2): PA mader system (598) Image: Standard Standard Image: Standard Standard Image: Standard Standard Image: Standard Standard Image: Standard Standard Image: Standard Image: Standard Image: Standard	
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After finished the Process, Click **Save and compile**.

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Compile will proceed.

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After finishing the Hardware configuration, go to Simatic manager window. Click on **S7 Program**.



Right Click on Work area and click **Insert New Object** \rightarrow CFC.



A new CFC Will is created under the Chart Folder. Click to Open the CFC.



To start the Program, Go to **Library** tab.

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To use safety I/O's, Open the Folder "S7 F System Lib V1.3" and go to F- User Blocks\Blocks

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To add a Digital Input, Select Channel Driver Digital Input from Driver folder.

When you drag and drop the Block into the chart, it shows a popup to create a password. It is Compulsory to create a password to program for a safety input and outputs

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Once you created a Password, Block will be generated.

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To make a ADD gate logic, Make Two Input Blocks and one Output blocks from the Driver folder.



For ADD GATE, Go to **BIT_LGC** \rightarrow **F_AND4** and Drag and drop the block.



Click on respective input and output terminals for interconnections as shown in the image.



To connect Inputs, right click on Value in Input driver block and select **interconnection to Address**.



It will show the I/O List. Select F_start.



Proceed the Same for both inputs and outputs



Check whether you had made all the connection.



Next Select "compile" on the Tool Bar



Select Entire Program and click OK



Compilation will proceed and it takes Few minutes to complete.



Click OK.



Click Close.



Next click Download.



Select 192.168.1.1 and click OK



Click Entire Program and click OK

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Now the Program has been completed and you can check it on the field by activating the two input switch and verify the output through the LED.

To create a **OS station**, go to **Simatic** window \rightarrow click on Project name \rightarrow in work area right click \rightarrow **Insert new Object** \rightarrow **Preconfigured Station**.



Click Next.

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	Intel(R) PRO/2000 K	Min Network Conr

Now OS will start to Create. It takes few minutes.

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Press F1 to get Help.	Intel(R) PRO/1000 MT Network Conr Selected: 1/7
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After PC station created, Rename it to your **PC name**.

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		System Rating: Processor: Installed memory (RAM): System type: Pen and Touch: Computer name, domain, and	Windows Experience Index Intel(R) Core(TM) (7-8550U CPU (9 1.80GHz 1.99 GHz 8.00 G8 64-bit Operating System No Pen or Touch Input is available for this Display workgroup settings	
1	See also Action Center Windows Update Performance Information and	Computer name: Full computer name: Computer description: Workgroup: Windows activation Windows is activated	PCS7V90 PCS7V90 WORKGROUP	
Press F1 to get Help.	Tools	Product ID: 00426-OEM-8	992662-00006 tel(R) PRO/1000 MT Network Conf	Selected: 1/9 510 PM 510 PM

Next click Configuration

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Now drag and drop the IE general to the first slot.



Set the IP address of the PC to IE general as 192.168.1.98

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Click on Configure Network in toolbar



Now Available Station are shown on the screen and rearrange them by drag and drop.



Right click on CPU 410E and select Insert New Connection.



Select WinCC Appl and click OK.



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Click PC station and **Download**. Close the Window once you finish the download.

Now click on **OS**(1) and Right click on work area \rightarrow **Insert New Object** \rightarrow **Picture**.

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Click **Compile**. It will take few minutes.

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Now right the OS(1) and click **Open Object**

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Create **Hierarchy Folder** by below Procedure.

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A **Process cell** folder will be created.

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Create a new **CFC** under the Folder.

Double click to open the CFC.

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For PID, Drag and Drop Analog Input driver block.



Drag and Drop Analog Output driver block.



Drag and Drop Continuous PID controller – Small block.



CFC - [CFC(2) TRAIL\Process cell(1)]		- 0 -
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Now Connect the PV In Address by right click on it



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Select as LEVEL_PV



Interconnect **PV out** to **PV** of PID Block.



Interconnect MV to PV In in Output block.



Now Connect the PV Out Address by right click on it



Select PUMP_CV.



Now go to simatic window and create a Picture in Plant view in Process Cell Folder.

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Go to **Component** view.

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Compile the OS and Open the OS(1)

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	Display compilation log							
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Activate the OS.

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From the OS, we can set the set point for the **PID Block** and verify the result

