GOVERNMENT OF TAMILNADU

DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI-25

STATE PROJECT COORDINATION UNIT

(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name	**INSTALLATION OF AC MOTOR CONTROL CIRCUITS**
Course Code	**EE/2020/004**
Course Duration	40 Hours
Minimum Eligibility Criteria	10th/+2 /ITI/Diploma/Graduates
Pre-requisites (if any)	-
Course Objectives	Training module has been designed for the participants to • Understand the components of Motor Control Circuit. • Use industry specific terminology to explain or discuss motor operations. • Understand the sequence of operation of AC Motor control circuit • Construct and test control and power circuit of AC Motor. • Identify the faults in motor control circuit.
Course Outcomes	At the end of training, the trainees will be able to • Explain the operation of Contactors, Timer and OLR • Identify the name of components in Motor Control Circuit. • Construct AC Motor control circuit to start, stop and apply electrical braking of motors for various operations. • Identify the fault and rectify it in Motor Control Circuit • Explain the operation of both control and power circuit of AC Motor
Expected Job Roles	Motor Control Circuit Technician

TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of Examination
				Min	Max	
EE/2020/004	INSTALLATION OF AC MOTOR CONTROL CIRCUITS	Theory	16	10	20	3 Hours
		Practical	24	40	80	
		Total	40	50	100	

EE/2020/004–INSTALLATION OF AC MOTOR CONTROL CIRCUITS

DETAILED SYLLABUS

Unit No	Modules	No.of.Hours	
		Theory	Practical
I	**Components of Control Circuit**	**06 Hours**	
1.1	Manually operated switches	06	-
1.2	Primary and pilot control devices		
1.3	Symbols		
1.4	Operation of Electromechanical control relay		
1.5	Solenoid type contactor		
1.6	Time delay relays – Counter		
1.7	Bimetallic thermal OLR		
1.8	Identification of Relay coil		
1.9	NO Contact and NC Contact		
1.10	Selection of Contactor		
1.11	Maintenance of Contactor		
II	**Basics of Control Circuit:**	**15 Hours**	
2.1	Function of motor control circuit	05	10
2.2	Control circuit Vs Power circuit		
2.3	2 wire and 3 wire control circuit		
2.4	Development of 3 wire control circuit		
	Practical:		
2.5	Single motor starter with one push button control station		
2.6	Single motor starter with two pushbutton control station		
2.7	Motor control with auxiliary contact controlled status indicator lamp		
2.8	One motor automatically starting a second motor using auxiliary contact		
2.9	One motor automatically starting second motor after time delay		
2.10	Electrically interlocking 2 motors to prevent simultaneousoperation		
III	**Practical:AC Motor Control Circuit:**	**19 Hours**	
3.1	Full voltage starting of AC induction motor	05	14
3.2	Semi Automatic start delta starter		
3.3	Automatic star delta starter		
3.4	Reversing the direction of rotation of induction motor		
3.5	Jogging in cage induction motor		
3.6	Plug stop of induction motor		
3.7	Dynamic braking of cage induction motor		
3.8	Starter for two speed two winding motor		
3.9	Three step rotor resistance starter for wound induction motor		
3.10	Troubleshooting in control circuit.		
	Total Theory and Practical Hours	**16**	**24**
	Total hours	**40**	

HARDWARE REQUIREMENT

S.NO	LIST OF TOOLS /EQUIPMENTS
1	Continuity Tester
2	Contactors, OLR
3	Timers
4	Pushbutton
5	Switches
6	Connecting Leads

SOFTWARE REQUIREMENT

NIL

REFERENCE BOOKS

S.NO	NAME OF THE BOOK	AUTHOR	PUBLISHER
1	Motor Control Fundamentals	Steve Senty	Cengage Learning
2	AC Motors for High Performance Applications: Analysis and Control	YAMAMURA, Sakae Yamamura	CRC Press
3	AC and DC Motor Control	Gerald A. Moberg	Wiley, 1987
4	Solid-State AC Motor Controls: Selection and Application	Sylveste Campbell	CRC Press

ASSESSMENT AND CERTIFICATION

S.No	Criteria for assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the CIICP Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory and Practical.
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions (1 word/objective type questions)
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the CIICP Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max. Marks
1.	Theory Examination	20
2.	Practical Examination	
	a)Objective and Circuit Diagram	20
	b)Procedure and Connections / Execution	20
	c)Result and Viva	20
	d) Record	20
	Total Marks	**100**

THEORY MODEL QUESTION PAPER

EE/2020/004 -INSTALLATION OF AC MOTOR CONTROL CIRCUITS

(Maximum Marks: 20)

(N.B: Answer any Twenty questions) 20x1= 20 Marks

1. What are the two types of motor control devices?
2. Draw the symbol of push button.
3. What is a relay?
4. What is an ON delay timer?
5. What is the purpose of shading ring on magnetic pole faces of AC contactor.
6. What are the two types of pushbutton switches?
7. Draw the Contact symbol of OFF delay timer.
8. What is mean by pilot motor control device?
9. What is mean by primary motor control device?
10. What is meant by inching of a motor?
11. How will you connect remote start with local start?
12. What is an interlock contact?
13. Draw the motor control circuit with holding contact.
14. Draw the single control circuit for single motor starter with one pushbutton control station.
15. Mention the functions of motor control circuits.
16. State True or False. Thee-wire motor control circuits provide true no-voltage and low-voltage drop-out protection.
17. Draw the control circuit of DOL starter.
18. List the types of star delta starter.
19. What do you mean by plug stop in induction motor?
20. Mention the precautions to be taken for reversing control of AC motor.
21. What is a power circuit?
22. How will you connect retaining contact in DOL starter?
23. How will you reverse the direction of rotation of 3 phase induction motor?
24. Which braking causes less heat generation?
25. How many leads are to be brought out from the motor while using star delta starter?