

# **6 – HOUR UNDERSTANDING CONTROL VALVES OUTLINE**

## **SERVICE TRAINING COURSE**

### **I. INTRODUCTION**

- CLA-VAL CO.
- COURSE OBJECTIVES
- SERVICE TRAINING MANUAL

### **II. BASIC HYDRAULICS**

- FORCE EQUALS PRESSURE TIMES AREA
- PASCAL'S PRINCIPLE
- HYDRAULIC ADVANTAGE
- EXAMPLE IN HYTROL OPERATION

### **III. MAIN VALVE – HYTROL**

- INTRODUCTION
- BASIC DESIGN FEATURES
- BASIC PRINCIPLE OF OPERATION: OPENING AND CLOSING
- COMPONENTS: DETAIL DISCUSSION
  - ❖ BODY
  - ❖ DIAPHRAGM ASSEMBLY
  - ❖ COVER
- DISASSEMBLY
- CLEANING AND INSPECTION
- MAINTENANCE AND REPAIRS
- REASSEMBLY
- TROUBLESHOOTING SEQUENCE
- EMERGENCY PROCEDURES

- OPTIONAL FEATURES
  - ❖ EPOXY COATING
  - ❖ DELRIN SLEEVE STEMS
- ON-OFF OPERATION
  - ❖ 3-WAY PILOT VALVE SYSTEM
  - ❖ MANUAL/FLOAT/SOLENOID
  - ❖ SPEED CONTROLS
- EXAMPLES OF APPLICATION
  - ❖ DIRECT AND REMOTE MOUNTED PILOT
  - ❖ FLOAT VALVE SERIES 124
  - ❖ SOLENOID VALVE SERIES 136

#### **IV. PRESSURE REDUCING VALVES – SERIES 90**

- INTRODUCTION OF BASIC REGULATOR/THROTTLING VALVES
- BASIC THROTTLING PILOT SYSTEM
- BASIC PILOT SYSTEM OPERATION (REDUCING)
- RESTRICTION
- COVER CONNECTION
- PILOT CONTROL – CRD
  - ❖ OPERATION
  - ❖ COMPONENTS
  - ❖ SERVICING
- TROUBLESHOOTING
  - ❖ PRESSURE REDUCING VALVE
  - ❖ CRD PILOT CONTROL VALVE
- ADJUSTING
- OPTIONS
  - ❖ SPEED CONTROL – CV

- ❖ REMOTE PRESSURE SENSING – CRA
- TYPICAL INSTALLATIONS
  - ❖ SERIES – TO AVOID CAVITATION
  - ❖ PARALLEL – TO HANDLE WIDE RANGE OF FLOW RATES
- COMBINATION VALVES
  - ❖ 91 SERIES
  - ❖ 92 SERIES
  - ❖ 93 SERIES

## **V. PRESSURE RELIEF VALVES – SERIES 50**

- ONE VALVE – 3 JOBS
- BASIC PILOT SYSTEM OPERATION (RELIEF)
- STRAINER-NEEDLE VALVE ASSEMBLY – X42N-2
  - ❖ OPERATION
  - ❖ COMPONENTS
  - ❖ SERVICING
- TROUBLESHOOTING
  - ❖ PRESSURE RELIEF VALVES
  - ❖ CRL PILOT CONTROL VALVE
- ADJUSTING
- OPTIONS
- TYPICAL INSTALLATION/APPLICATION
  - ❖ RELIEF
  - ❖ SUSTAINING
  - ❖ BACK PRESSURE
- COMBINATION VALVES
  - ❖ 58 SERIES
  - ❖ 92 SERIES

## **VI. FLOW LIMITING VALVES – SERIES 40**

- BASIC PRINCIPLE OF A CONSTANT FLOW RATE
- DIFFERENTIAL PRODUCING DEVICES
- ORIFICE PLATE/VENTURI
- BASIC PILOT SYSTEM OPERATION (FLOW LIMITING)
- RESTRICTION
- COVER CONNECTION
- PILOT CONTROL – CDHS-18
  - ❖ OPERATION
  - ❖ COMPONENTS
  - ❖ SERVICING
- TROUBLESHOOTING
  - ❖ FLOW LIMITING VALVES
  - ❖ CDHS-18 PILOT CONTROL VALVE
- ADJUSTING
- OPTIONS
- TYPICAL INSTALLATION/APPLICATION
- COMBINATION VALVES
  - ❖ 49 SERIES

## **VII. ALTITUDE VALVES – SERIES 210**

- BASIC FLOATLESS LIQUID LEVEL CONTROL OPERATION
- 3-WAY PILOT SYSTEM REVIEW
- PILOT CONTROL – CDS 4
  - ❖ OPERATION
  - ❖ COMPONENTS
  - ❖ SERVICING
- TROUBLESHOOTING
  - ❖ ALTITUDE VALVES

- ❖ CDS4 PILOT CONTROL VALVE
- ADJUSTING
- OPTIONS
- TYPICAL INSTALLATION/APPLICATION
- COMBINATION VALVES

## **VIII. DEEP WELL PUMP CONTROL VALVES**

- BASIC PUMP STARTING & STOPPING SURGE CONTROL
- BASIC VALVE OPERATING SEQUENCE
- MAIN VALVE – POWERTRON

- ❖ DESCRIPTION
- ❖ OPERATION
- ❖ COMPONENTS
- ❖ SERVICING

- PILOT CONTROL VALVE – CSM SERIES

- ❖ 4-WAY SOLENOID
- ❖ MICRO-SWITCH ASSEMBLY – X105
- ❖ STRAINER – X43
- ❖ SPEED CONTROL – CV

- VALVE OPERATION

- ❖ PUMP OFF
- ❖ PUMP STARTING
- ❖ PUMP STOPPING

- TROUBLESHOOTING
- ADJUSTING
- TYPICAL INSTALLATION/APPLICATION

- ❖ SURGE PROTECTION

## **IX. BOOSTER PUMP CONTROL VALVES**

- BASIC PUMP STARTING & STOPPING SURGE CONTROL

- BASIC VALVE OPERATING SEQUENCE
- MAIN VALVE – POWERTRON
  - ❖ DESCRIPTION
  - ❖ OPERATION
  - ❖ COMPONENTS
  - ❖ SERVICING
- PILOT CONTROL VALVE – CSM SERIES
  - ❖ 4-WAY SOLENOID
  - ❖ MICRO-SWITCH ASSEMBLY – X105
  - ❖ CHECK VALVES – 3/8” 81
  - ❖ SHUTTLE VALVES – CVS
  - ❖ SPEED CONTROL – CV
- VALVE OPERATION
  - ❖ PUMP OFF
  - ❖ PUMP STARTING
  - ❖ PUMP STOPPING
- TROUBLESHOOTING
- ADJUSTING
- TYPICAL INSTALLATION/APPLICATION
  - ❖ SURGE PROTECTION