Cost effective, single-phase recloser

OVR-1: Single Phase Recloser

Customer Presentation

July 2007

Topics of Interest

- Recloser History
- Market Trends
- Features / Advantages
- Main Components
  - HCEP material
  - Improved pole design
  - Low Voltage Cabinet
  - ICD control / WinICD Software
- Electronic v. Hydraulic
- Ratings
- Support

Recloser History

- 1997 – 2003: VR-3S Solid Dielectric recloser with PCD Control
  - Manufactured over 6,000 units
  - Single Phase Trip option added in 2000
  - Loop Control option added in 2001
    - Utilizing the same control and upgradeable to all users
- 2003: OVR-3, 15/27 kV 3-Phase Recloser with PCD Control
- 2004: OVR-3, 38 kV 3-Phase Recloser with PCD Control
- 2005: OVR-3SP, 15-38 kV Single Pole, 3-Phase Recloser with PCD Control
- 2005: OVR-1, 15 - 27 kV, Single-Phase Recloser with ICD Control

Market Trends

Why would utilities want to upgrade to a single-phase, solid dielectric recloser with electronic control???

- Increased Reliability
- Higher level of coordination
- Higher interrupting rating
- Eliminate oil from system
- Communication capability

Features

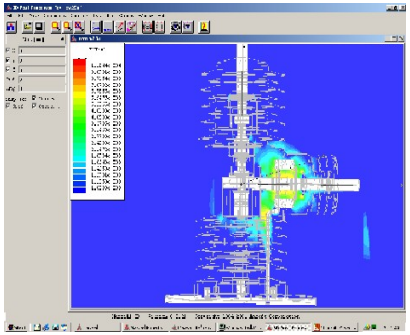
- Vacuum recloser with 2nd generation magnetic actuators
  - 10,000 mechanical/load operations
- Integrated current sensor
- Near maintenance free design
- Advanced HCEP Insulation Technology
- Integrated Control Device
- Controls away from High Voltage Compartment for Safety
- Compact / Lightweight
- Environmentally friendly – no oil or SF_6

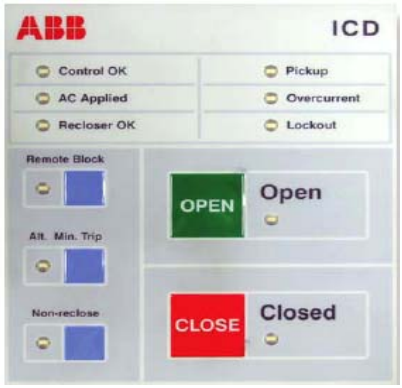
OVR-1 Advantages

Electromechanical Counter

- Integrated single pole design
- **Faster operation to save more fuses**
- Tripping and lockout can be done with hookstick from ground level, or from control panel (mechanical trip and block close)
- Can be utilized with one lift installation
- Significantly higher creepage than required by IEC/ANSI standards for very heavy pollution
- Modbus-DNP converter available for remote communications
- Electromechanical counter is standard
- Available Undervoltage Trip/Restore Function

OVR-1 Main Components





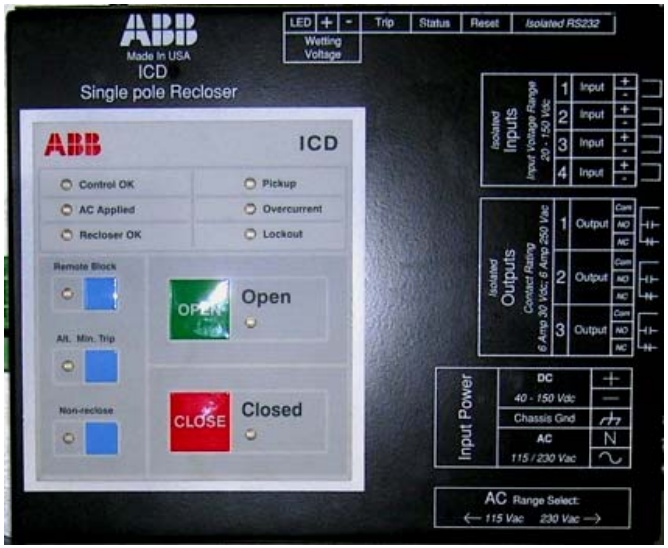
- Hydrophobic Cycloaliphatic Epoxy (HCEP)
  - Improved Hydrophobicity over CEP
  - Mechanical strength of epoxy
  - Low leakage currents
  - Lower flash over probability
  - Pollution Performance you can count on
  - Better material = More reliable
- Improved pole design
  - Higher creepage
  - Computer modeled for improved reliability (new technology)
  - 2nd generation actuator design
  - Better design = More reliable
- ICD Recloser Control
  - WinICD configuration on PC
  - Easy to use
  - Improved control = More reliable

OVR-1 Low Voltage Cabinet

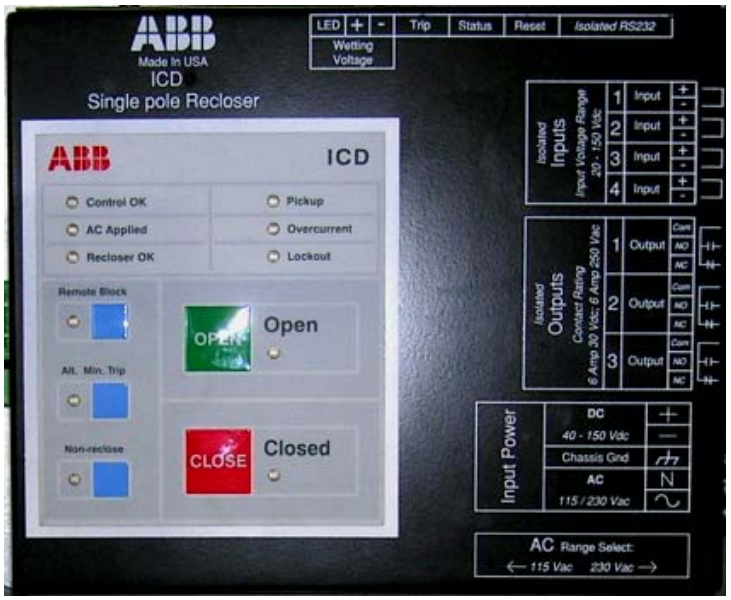
- Compact lightweight design
- 304 Stainless Steel Cabinet
- Integrated high energy surge protection in accordance with ANSI/IEEE C37.90.1 – 2002 & applicable IEC standards
- Lockout indicator light
- Heater
- Integrated capacitor assist for operating when battery discharged
- Optional batteries provide backup power for 24 hours during loss of AC source power (at least 100 open and close operations)

ICD Control

- Fully integrated magnetic actuator-based control including energy storage capacitors
- Automatic actuator coil continuity check
- Remote control via RS232 serial communication port
- Built in discrete I/O
- Fault current indication
- Continuous self-diagnostics of power supply, memory elements and microprocessors
- AC or DC powered for flexibility
- Accurate coordination – less co-tripping and fuse operations

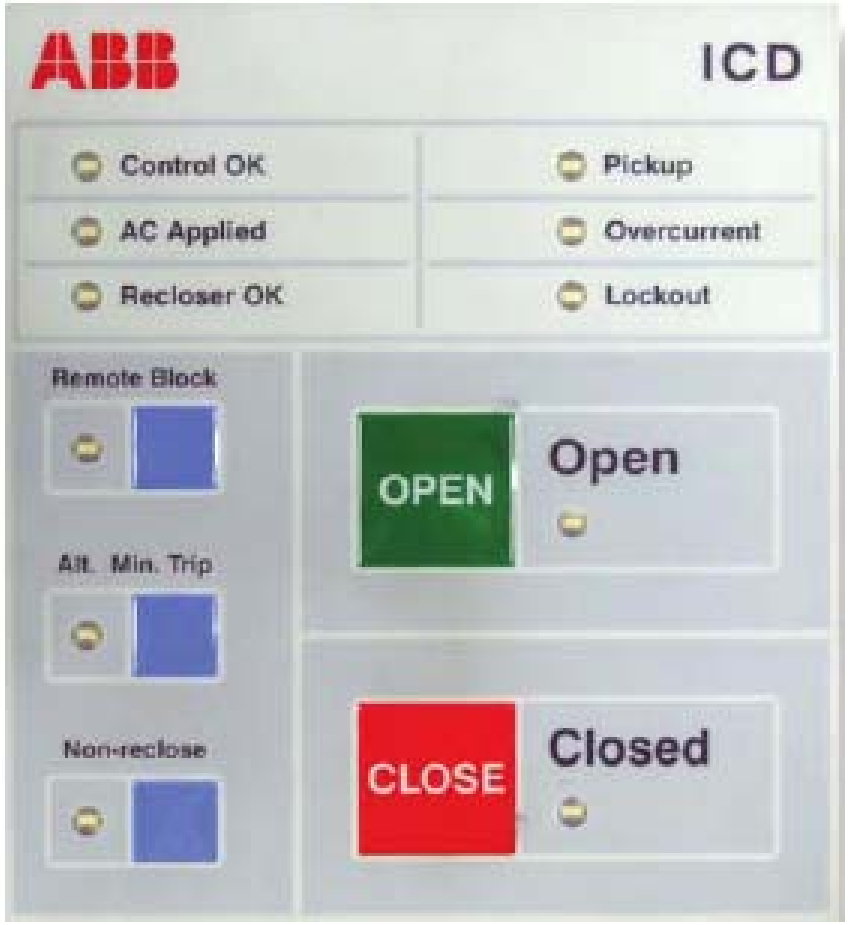


ICD Control



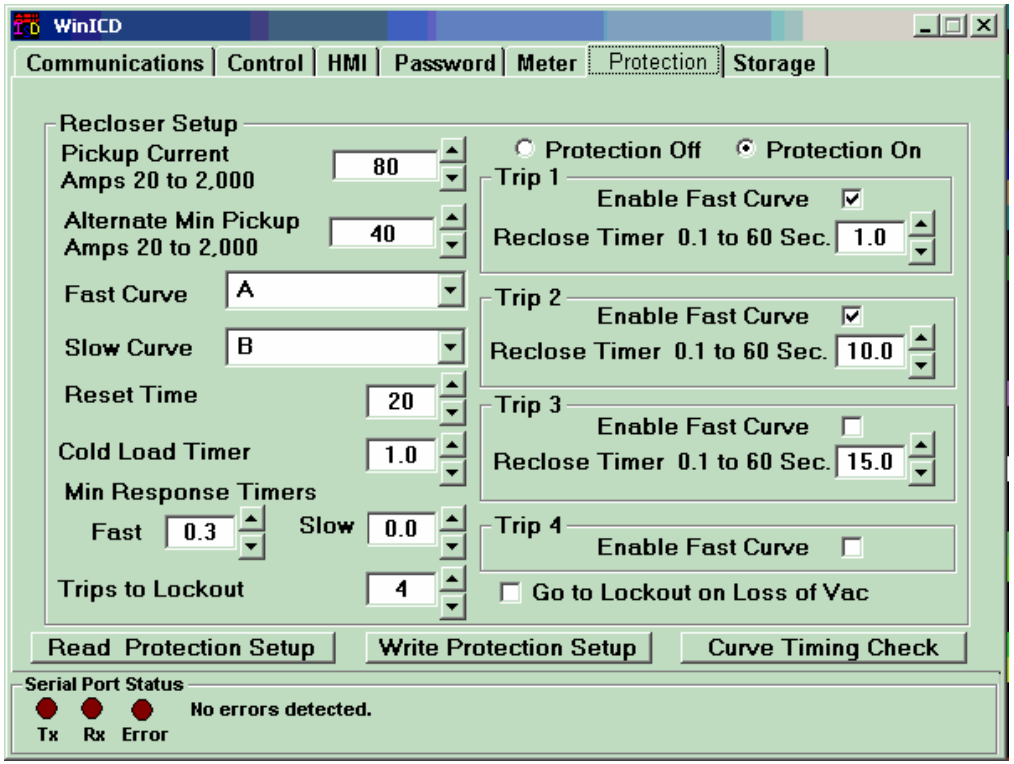
- ICD Intelligent Control Device
  - All basic recloser functions
  - 13 recloser curves
    - A, B, C, D, E, F, N, R, EF, KF, TF, Y, T
  - 6 ANSI curves
    - Extremely Inverse, Very Inverse, Inverse, Short Time Inverse, Standard Instantaneous, Inverse Instantaneous
  - Alt min trip setting for alternate pickup (higher of lower value with same curves)
  - Cold load pickup
  - Consistent electronic timing provides superior coordination with down-line devices
  - Up to 4 shots to lockout
  - Modbus ASCII protocol with available DNP converter
  - Available Undervoltage Trip/Restore Function

ICD Control – HMI



- Target indicators
  - Pickup
  - Overcurrent Trip
  - Lockout
- Recloser Status
  - Control OK
  - AC Applied
  - Recloser OK
- Large buttons
  - Open / Close
  - Remote Block
  - Alt. Min. Trip
  - Non-reclose

WinICD Software



- Receive/transmit settings
- Setup for all overcurrent protection and reclosing parameters
- Curve modifiers to allow more flexibility when coordinating
- Test software built in for cycling unit
- Test communications
- Displays alarm messages
- Maintains counter
- Available Undervoltage Trip/Restore Settings

OVR-1 versus Hydraulic

OVR-1

- Environmentally friendly
- High fault interrupting capability
- Stable timing and coordination including ANSI curves
- Low maintenance costs
- High load current rating
- One size fits all amp rating (interchangeability)

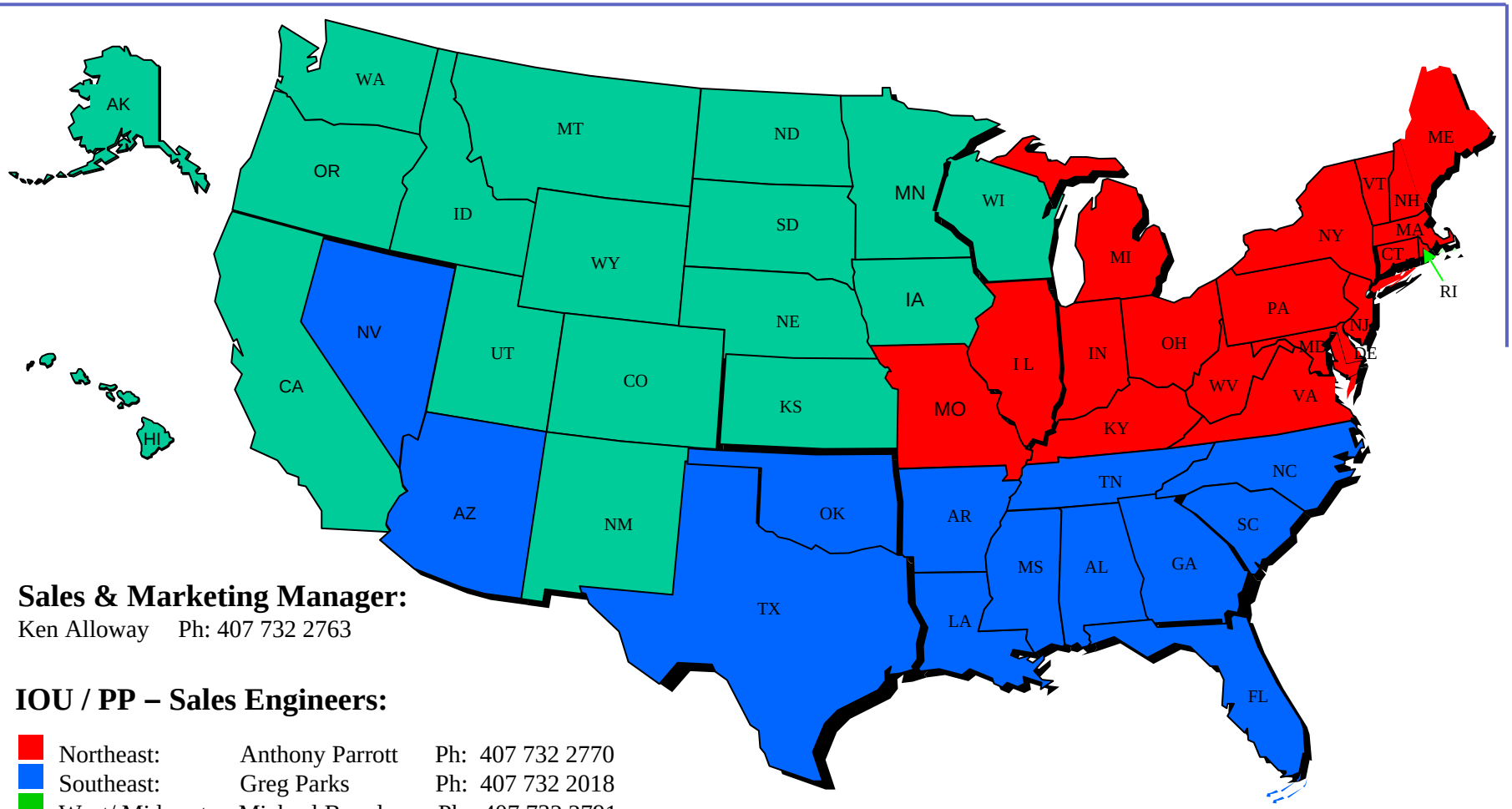
Hydraulic

- Lower interrupting ratings
- Timing / Coordination can vary depending on temperature, condition of oil
- Typical maintenance interval - 5 – 7 year cycle

OVR-1 Ratings

Nom. operating voltage:	2.4-14.4	24.9	kV
Rated Max. voltage:	15.5	27	kV
Rated power frequency	50/60	50/60	Hz
Rated continuous current:	400/800	400/800	A
Rated symmetrical interrupting current:	6/10	6/10	kA
Rated lightning impulse withstand (BIL):	110	125	kV
Dry withstand 60 Hz 1 Min.:	50	60	kV
Wet withstand 60 Hz 10 Sec.:	45	50	kV
External creep distance, H2-ground:	38.00 (960)	38.00 (960)	inches (mm)
External creep distance, H1-H2:	45.00 (1160)	45.00 (1160)	inches (mm)
Min. external strike distance:	9.50 (240)	9.50 (240)	inches (mm)
Max. interrupting time:	0.030	0.030	sec max
Max. closing time:	0.055	0.055	sec max
Materials: Vacuum interrupter encapsulated in hydrophobic cycloaliphatic epoxy with cast aluminum high voltage cabinet; stainless steel low voltage cabinet			
Current sensors:	One per phase encapsulated into the pole		
Operating temperature:	-40° to +70° C		
Control voltage:	120/240 VAC		
High voltage unit weight:	100 (45)	100 (45)	lbs (kg)
Control cabinet weight:	55 (25)	55 (25)	lbs (kg)
Battery (optional)			
• 48 VDC 7.2 AH battery bank			
• Sealed lead acid rechargeable battery pack			
• Easily accessible in low voltage control cabinet			
• Allows for up to 24 hour carryover and multiple operations upon loss of power			
• Includes capacitor backup for battery assistance			

ABB Inc
Sales Regions – Reclosers, Outdoor Breakers & Padmount Switchgear
Lake Mary, FL USA



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