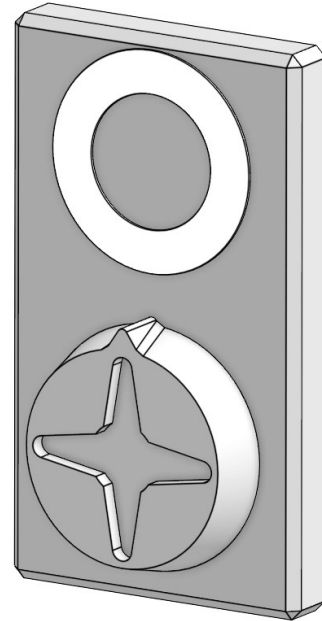# VALO-MK1

Electronic vault door authentication module

The VALO-MK1 is an advanced vault door authentication module designed for medium-security access control applications.

Key features:
- Tamper proof
- Compact
- Multiple modes of operation:
  - *Pulsed Light™* Unlock Protocol
  - Manual mechanical input

For streamlined deployment and maintenance, the mode of operation, as well as the secret key tables, may be configured prior to operation by provisioning technicians, as well as dynamically during operation.

For technical assistance with the VALO-MK1, contact the SuperSEC Support Hotline: (248) 434-5508

Manual mechanical input mode

When configured in the Manual mechanical input mode of code entry, the VALO-MK1 acts as a classic mechanical combination lock, in which users must rotate the control knob in alternating directions through the set of preconfigured positions. An input sequence is initiated by turning the knob all the way to the leftmost position, then beginning to turn the knob clockwise.
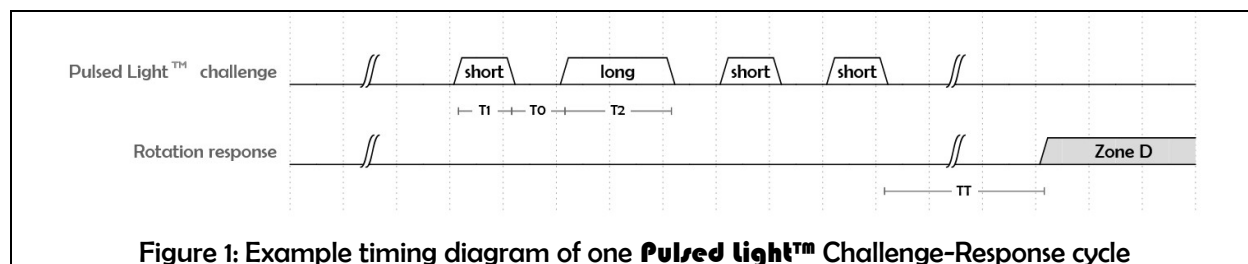
Mode specification:
- Sequence length: 10 positions
- Position interval: -90 ... +90 degrees
- The entire sequence must be performed in < 20 seconds
- A sequence item is considered failed if the position overshoots by more than 5 degrees

Pulsed Light™ Unlock Protocol mode

When configured in the **Pulsed Light™** mode of code entry, the VALO-MK1 can only be opened by compatible electronic vault door openers, with which it communicates using the proprietary **Pulsed Light™** protocol in Challenge-Response mode. A formal description of the communication protocol can be found in manual *MN-0134*. In short, to open the vault, the VALO-MK1 interacts with a compatible pre-paired electronic vault opening module in two steps:

1. **Challenge:** VALO-MK1 transmits a sequence of short and long pulses of white light.
2. **Response:** The vault opener rotates control to appropriate zone (**Figure 4**) depending on: the number of long and short pulses received; the pre-configured access code mapping (**Table 3**).

The challenge-response sequence repeats up to 10 times for improved security.

Figure 1: Example timing diagram of one **Pulsed Light™** Challenge-Response cycle

Quantity	Symbol	Min	Typ	Max	Unit
Short pulse length	T1	1	3	15	
Long pulse length	T2	38	40	60	ms
Inter-pulse spacing	T0	30	40	60	
Response time	TT	-	-	1000	

Table 2: **Pulsed Light™** mode timing characteristics

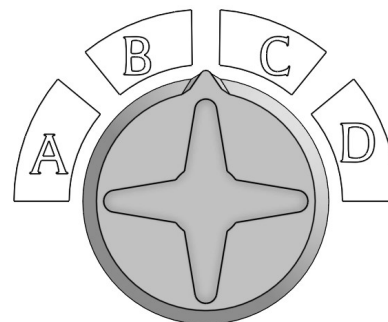|	1 long pulse	2 long pulses	3 long pulses	4 long pulses	5 long pulses
1 short pulse	A	A	B	A	C
2 short pulses	C	B	C	C	B
3 short pulses	D	A	C	D	C
4 short pulses	B	D	B	B	A
5 short pulses	D	C	A	B	C

Table 3: Default access code mapping in **Pulsed Light™** mode   Figure 4: Rotation Zones in **Pulsed Light™** mode